# The Chemical Age

**A Weekly Journal Devoted to Industrial & Engineering Chemistry**

VOL. IV. MAY 14, 1921 No. 100

## Contents



*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

*The prepaid subscription to "The Chemical Age" is 21/- per annum for the United Kingdom, and 26/- abroad. Cheques, P.O.O.'s, and Postal Orders should be made payable to Benn Brothers, Ltd.*

*Editorial & General Offices—8, Bouverie Street, London, E.C.4.*

*Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (4 lines).*

## Our Key Industries

THE "safeguarding of industries" is a nicer term than "Protection," which has political associations that instantly challenge the Free Trader; but it means Protection none the less, and it is as well to face the plain fact at the outset. This is not to say that the Key Industries Bill, which is virtually certain to become an Act of Parliament within the next few weeks, is necessarily bad. On the contrary, we do not see how the Government could honourably escape from the obligation to pass it. During the war, when we ran short of many necessaries which we had hitherto relied on foreign producers to supply, we realised for the first time certain limitations to the undoubted advantages of free imports. One of these was the neglect to provide for our own essential needs out of our own resources. Never again, people of all parties declared, could we afford to trust foreign resources; for the future we must safeguard our own supplies. On the strength of these assurances, on which the Government of the day smiled approval, capital was invested in new businesses on the assumption that they should not be swamped in their infancy by foreign competition. Those who undertook those enterprises are entitled to demand the fulfilment of the pledges on which they acted. The Key Industries Bill, in which the Financial Resolutions introduced in the House of Commons on Monday are presently to be incorporated, is merely the fulfilment expected, and we do not see how the Government could honourably have failed to keep faith with the industries concerned.

Having frankly accepted the position so far, let us recognise with equal frankness some of the conditions to be observed if we are to avoid the risks inseparable from protective legislation. The first is that the protection must be temporary. The period mentioned in the Resolutions is five years. If in that period our new industries have not established themselves in a position to compete on equal terms with foreign productions, then they must accept the fate of the admittedly unfit. That, we think, should be made absolutely clear to every industry protected by the new measure. The Bill must not be perverted into a refuge for inefficiency, and British manufacturers who accept its protection accept it on the condition that their fate at the end of five years will be determined by the results of their own efforts.

Secondly, there must be some limit to the number of protected industries. The tendency of protection is to spread. Privileges given to one industry are inevitably demanded by others, and in a sense quite reasonably so. But in this matter it is not proposed to adopt protection as an ideal system for everybody. It is merely demanded as a temporary aid to industries with special claims. Already the list is longer than most people had originally contemplated. Nine industries are included in the Resolutions, and with the dyestuffs industry, already protected under a special Act, we shall have ten enjoying preferential treatment. This puts a sufficient strain on the loyalty of other industries and of the general public.

Thirdly, in order to give these ten industries the special protection they demand, the rest of the nation voluntarily submits to a temporary tax, at a time when taxation has about reached the limit. We have no doubt at all that the Customs duty of 33⅓ per cent. will fall on the British consumer. We shall pay at least that percentage more for the goods we purchase, and we shall be paying it to give certain of our industries a chance to survive. The immediate loss may possibly be balanced by indirect advantages later, principally the employment of British labour and the sense that we are doing something to make ourselves nationally independent in case of energemcy. But the tax for the present is a reality.

The country, we believe, is prepared to accept the tax, much as a large and a growing section dislikes these artificial restrictions on the free exchange of commodities. It is doubtful if it would stand any further extensions. The moral for our manufacturers

is that by the end of five years they must be able to live on their merits or cease to exist. Their fate lies in their own hands.

## Wood Distillation Industry

THE article which Mr. E. C. Powell, F.C.S, contributes to this issue of THE CHEMICAL AGE on "Wood Distillation as a National Industry," presents an attractive picture of the possibilities in this field. The maintenance of our coal supplies is becoming so troublesome and costly that the nation would willingly turn to any substitute that promised to alleviate the national difficulty, and certainly our present circumstances predispose the public to consider seriously any suggested new source, not only of fuel, but of the valuable by-products derived from coal.

Shortly, our contributor suggests that we have large supplies of wood available in this country, and that from wood may be obtained pretty nearly everything derived from coal. Apart from its primary use as fuel, wood, by scientific methods of distillation, may be made to yield charcoal, gas, wood oil, wood tar, and pyroligneous liquors yielding wood spirit or methyl alcohol, acetone, acetate, &c. It will be news to many to hear that during the war the Government established several factories for the distillation of wood, and that our knowledge of modern methods of treatment is more advanced than those of most other countries. Wood tar is known to possess benzene, toluene, and naphthalene; in fact, all the substances from which coal tar or aniline dyestuffs are built up, while in addition there are the further products, coming more and more into commercial use, such as methyl alcohol, acetone, and acetic acid. In short, on the case built up by Mr. Powell, wood, scientifically distilled, may furnish us with an additional source of all the primary and secondary products of coal, and if these claims are substantially sound, there never was a more favourable moment for considering the possibility of developing wood distillation as a national industry.

Our contributor, no less than ourselves, will be glad to have expressions of opinion from any readers who may be interested in such a project, either from the scientific, technical, or commercial points of view. In particular, Mr. Powell is anxious to have particulars as to the present and potential absorption of charcoal in various industries, provided supplies could be guaranteed in ample quantities and at an economic price. Charcoal burning is known as one of the oldest and most primitive of our national industries. Charcoal is already used in the reduction of iron ore, the manufacture of explosives, refining processes, medicinal and other purposes, and in various ways in connexion with chemical works. It is possible that its absorption in industry might be enormously increased, and our contributor would be grateful for more exact information on this point, as well as on the forms in which charcoal might most usefully be produced—stick, powder, or briquette. Whatever may be thought of the commercial possibilities of wood distillation in this country, the article is an extremely suggestive contribution, and opinions on the various points raised will be welcomed.

## The Dangers of Rubber Dust

AN interesting investigation has recently been made by the U.S. Department of Agriculture in connexion with a rubber dust explosion which resulted in the death of eight men. The process carried out in this instance was in connexion with the reduction of scrap rubber which is first broken up into small pieces and then ground in a pulveriser. Large quantities of a very fine dust are produced during the latter operation, and it is this dust which is violently explosive under favourable conditions, while considerable quantities of sulphur dioxide are frequently evolved. A number of theories have been suggested for the cause of the explosion. For instance, the rubber may have been ignited by sparks formed when some foreign material entered the grinding machine with the scrap rubber. It is known that pieces of metal are frequently found in scrap rubber, and explosions in other industries have been caused by sparks formed when metal entered the grinding machine. An electric light may have been broken accidentally and the dust ignited by the hot filament. Again, static electricity often accumulates on moving machinery, and unless the machine is properly grounded the charge is built up until it becomes strong enough to break down the air gap and jump to some other machine or a ground. Further, a lighted match would ignite the dust, but in this case it was impossible to substantiate the theory that a match caused the explosion.

The most probable explanation would seem to be that some foreign material entered the grinder; but, whatever the cause, the explosion proves that special precautions are necessary when a process of the kind is being conducted. As regards these precautions, it is suggested that the grinding department should be separated from the remainder of the plant, that good ventilation should be provided, and an efficient dust-collecting system should be installed. In addition, special precautions must be taken to see that no metal enters the pulverisers, while electric lamps should be enclosed in vapour-proof globes and properly protected to prevent breakage. Perhaps, the golden rule is the strict observance of cleanliness, for a disastrous explosion cannot occur in a clean plant, because the flames cannot propagate unless the dust is present in such quantity as to form explosive mixture. The experience and the remedies suggested should prove instructive to those operating similar processes over here, and as illustrating the deplorable effects of an explosion of the kind we would recommend a study of some of the photographs of the works in question which appear in our contemporary, *Chemical and Metallurgical Engineering*.

## Conditions in the Phosphate Industry

SOME interesting sidelights in connexion with the phosphate fertiliser industry were brought out by Sir Archibald Mitchelson when he addressed the shareholders of the Anglo-Continental Guano undertaking the other day. In the first instance, it is to be noted that farmers in general are endeavouring to curtail the quantity of fertilisers used in the present season; but from the point of view of the producer the position is

not without its advantages. Fertilisers are essential for the effective growing of crops, and if the soil is starved now it will require all the more attention in succeeding years. Obviously the consumer must appreciate this fact; but, as in all other branches of industry, he is holding up his orders until some substantial fall in values take place.

Apparently, in the early part of 1920 the supplies of phosphates gave rise to a good deal of anxiety owing to the scarcity of shipping tonnage and the licensing policy of the French Government in regard to North African phosphates, both of which factors tended to curtail supplies. This position continued for the greater part of the year when, without any warning, large quantities of African material were offered owing to the inability of the French mnaufacturers to cope with the available supplies. The situation was complicated by the fact that over here the Government hesitated to give export licences for superphosphates, because they took the view that home farmers must be assured of an adequate supply of these types of fertilisers for the coming season. If, therefore, the raw material had come along in the usual quantities spread over the whole year instead of arriving in an avalanche, there would probably have been no question of the Government stepping in, and export orders at good prices might have been executed.

The result of the situation is that large stocks of material are now generally held. Certainly, the promise for the future is encouraging, but at the moment export trade is virtually non-existent; and, as explained above, the home consumer refuses to purchase anything beyond what is absolutely essential. On the Continent, however, things are very much worse, and the prices of manufactured fertilisers have been cut to pieces in a vain attempt to stimulate demand. Certain quantities of foreign superphosphate, probably unsaleable elsewhere, have been dumped into this country at prices which the British manufacturer could not consider without the prospect of ruin. Fortunately, however, the amount which has arrived has not been sufficient to cause anything approaching demoralisation.

## The Chemical Industry Club

THE visit of Sir William Pope to the Chemical Industry Club on Monday evening brought to a very successful close the series of experimental monthly meetings, and also put an end to any doubt as to the future of the Club as the social centre of chemical industry. Sir William Pope is mainly responsible for the great project—unhappily arrested for the moment owing to the depressed condition of industry—for the establishment of central chemical headquarters in London, and his address amounts almost to a definite pledge that the existing Club will be incorporated in that scheme whenever it is carried through. This is the best tribute that could be paid to the valuable work of its founders. The full limit of their ambitions may not, it is true, have been reached, but the success of their efforts has exceeded all expectations, and a valuable piece of social organisation has been brought into existence where nothing of the kind existed before.

The Club is already a recognised centre of chemical industry, and we see no reason why its activities should not be usefully extended. We have on a previous occasion expressed the view that it offers a platform for the discussion of what may be called the "politics" of the industry such as no existing society affords, and it is satisfactory to find Sir William Pope pressing this idea so warmly on the attention of the members. We can discover no rational ground for the fear that such a useful institution should be treated with aloofness by the various societies or by the Federal Council for Pure and Applied Science. Official diplomatic relations have now, in fact, been established between the latter body and the Club. The authorities of the Club have been extremely deferential to the older organised societies, and their wish to be friendly and polite has almost verged on timidity. This is an engaging quality in a young institution, but there is no reason why it should be allowed to cramp the activities of the Club, and now that Sir William Pope has openly given his blessing to the idea, we hope the Committee, encouraged by the success of the past session, will arrange a series of live discussions bearing on subjects outside the scientific and technical objects of the other societies. It is not the duty of the members to give the lead. It is the duty of the Committee to lead the members and the success of their past efforts amply justifies a modest spirit of adventure.

## The Calendar

| | | |
|---|---|---|
| May 17–20 | Textile Institute: Spring Conference. | Basle, Switzerland. |
| 19 | Chemical Society: Ordinary Scientific Meeting and Informal Meeting. 8 p.m. | Burlington House, Piccadilly, London. |
| 19 | Chemical Society: Informal Meeting. 8 p.m. | Burlington House, Piccadilly, London. |
| 20 | Royal Photographic Society of Great Britain: "The Choice of a Lens," by A. C. Banfield | 35, Russell Square, London, W.C. |
| 20 | Royal College of Science: Chemical Society: "The Cultured Chemist," by W. Randerson. | Royal College of Science, South Kensington, London. |
| 20 | Royal College of Science Union, Chemical Society: "The Cultured Chemist," by W. Randerson | Royal College of Science, South Kensington, London. |
| 25 | Society of Chemical Industry: Nottingham Section. 7 p.m. | Nottingham. |
| 26 | Concrete Institute Annual General Meeting. 7.30 p.m. | Vauxhall Bridge Road, London. |
| 27 | Royal Institution of Great Britain: "Elasticity," by A. Mallock. | Albemarle Street, Piccadilly, London. |
| 27 | Royal Society of Arts: "Industrial (including Power) Alcohol," by Sir C. H. Bedford. 4.30 p.m. | John Street, Adelphi, London. |
| 31 | Faraday Society: "Physico-Chemical Problems Relating to the Soil." Sir A. Daniel Hall will preside. | 10, Essex Street, London. |

### Book Received

A DICTIONARY OF CHEMICAL TERMS. By James F. Couch. New York: D. Van Nostrand Company. Pp. 204.

# Wood Distillation as a National Industry

## By E. C. Powell

*In the following article the writer discusses the prospect of establishing wood distillation as a national industry, and points out especially the need of more accurate information as to the present consumption of charcoal in industrial processes and the possibilities of increased consumption supposing that an adequate supply at an economic price could be guaranteed. He also draws attention to some interesting problems and possibilities for research in connexion with the utilization of "waste wood" throughout the country.*

WOOD DISTILLATION means the carbonisation of wood in closed vessels or retorts, condensation of the products of distillation, and the subsequent refining and treatment of these products. The crude products of this treatment of wood are charcoal, gas, wood oil, wood tar, and pyroligneous liquors yielding wood spirit or methyl alcohol, acetone, acetate, &c.

Probably one of the most familiar scenes to the eyes of our forefathers in rural England of the olden time was the charcoal burner following his peaceful avocation of dissipating into thin air some of the most valuable products of the soil. Of course, he did not know what he was doing and had no means of finding out, but is it not a "burning" shame that we, with all our accumulated stores of scientific knowledge, should still continue to waste the natural resources of the country as we certainly do? The war has cost us dearly—time alone can show the extent of our loss—but the extent of our gains will largely depend on our promptness in taking hold of the situation and turning these gains to account.

Among the gains, or what assuredly will become gains if due advantage is taken of them, probably the most important and far-reaching in these days of scientific progress is the knowledge, acquired at an enormous cost, that we have brains fully as capable of turning science to commercial account as any other race, and perhaps chemical science even more than other branches.

Another most important piece of knowledge gained is that within the country are natural resources which, scientifically utilised, will give us a great advantage over our rivals in the stern commercial war which it is beginning to be realised is the inevitable sequel to the physical war from which the world is now emerging.

Our home-grown supplies of wood are a far older source of national revenue than coal, but just as we have failed to use our unrivalled coal supplies to the best advantage by *exporting* a large proportion of the valuable by-products of coal distillation, coal tar, anthracene and other residues from gas making, to be converted into auiline dyes and other chemical products, so by continuing to *import* the products of wood distillation we are imposing an additional handicap on ourselves in the commercial struggle.

Moreover, in both these cases we are assisting in building up a vast chemical organisation capable on the shortest notice of conversion to the production of various forms of offensive and defensive weapons of modern warfare, the control of which, especially during the earlier stages of the war, more than once brought the enemy within sight of success and ourselves of disaster.

### Experience Gained in the War

Among the earliest points of danger disclosed was the fact that the Explosives Department foresaw an immediate shortage of acetate of lime, an indispensable ingredient in almost all modern explosives, our whole supply of which had been obtained from abroad. To meet this danger, factories were erected by the Government and by the end of the war a large amount of experience in the processes of wood distillation was gained; so much so that even after the Armistice the erection of two of these factories, then in progress and embodying the improvements in plant and processes arrived at in the earlier ones, was continued with the intention of carrying on the distillation of wood as an industry of national importance.

About this time, however, a revulsion of public feeling against the Government engaging in commercial enterprise caused the idea to be abandoned, and it therefore remains open for private enterprise to pick up the threads and save the situation.

Private enterprise, however, not having the public purse at its disposal, is obliged to proceed with due caution, and enquiries have therefore been directed to the study of this industry from three points of view; that is, accepting the broad principle that the industry of wood distillation is one which it would be of benefit to the country as a whole to establish firmly within the country, as

(*a*) a means of turning to account natural resources of the country;

(*b*) a safeguard for the supply of an essential war commodity should necessity again arise;

provided that

(1) Supplies of the raw materials can be assured;

(2) The knowledge and experience available can insure a definite yield of the products aimed at, of a quality agreeable to consumers' requirements, and at a cost which will admit of a reasonable margin of profit after meeting the expenses of manufacture including interest on capital;

(3) The quantities of the various products the market is capable of absorbing at the calculated sale value can be ascertained with approximate exactitude.

In studying the problem in the first instance as a whole the Ministry naturally selected as sites for the factories districts with large quantities of wood available, and it may here be remarked that "Wood" for the purpose of distillation, means what is commonly known as "waste wood" or "cord wood," consisting chiefly of boughs of trees, short pieces, slabs produced in squaring timbers, &c., in fact everything except loppings and small branches. Since that time, however, the position has very materially changed, and owing to the enormous rise in transport charges large quantities of cord wood, for which there has hitherto been a remunerative market as firewood, have become entirely unsaleable, and consequently a supply of the raw material for wood distillation may be considered as doubly secured, and with a corresponding reduction in the cost.

Although, as has been said before, charcoal burning is one of the oldest known industries, it is only within quite recent years that wood distillation has been evolved as a scientific industry and even now, with the exception of this country, very little practical science has been applied to research into the methods of treatment to produce the best results with the least expenditure, and the devising of machinery to translate these methods into practical results.

Thanks, however, to the necessities created by the war, a large amount of practical experience in this otherwise little known industry has been accumulated here, and though no doubt many further discoveries remain to be made, it may fairly be stated that we have available more technical knowledge than is possessed by any other country of the more modern methods of treatment of the many valuable products of wood distillation.

### Commercial Considerations

In considering the establishment of any new industry, or one involving the manufacture of products of a more or less new character, one of the greatest difficulties is to ascertain the extent to which such products can be marketed and their market value level. For instance, in the case of the dye industry it proved to be most difficult to ascertain with any degree of certainty the quantity of any particular dyestuff or intermediate for which this country afforded a ready and permanent market, and the economic price which could be regarded as its permanent selling value.

It was also obvious in many cases, but not by any means in all, that any reduction in production cost would either stimulate the existing consumption or would create in effect new sources of consumption.

With the wood distillation industry these factors have even greater weight, from the fact that many of the products of distillation are in a commercial sense still only in their infancy. Even in the case of charcoal, though one of the oldest known forms of heating agents, it seems more than probable that potential sources of consumption exist for various uses, some

of which can only be discovered by, in the first instance, indicating the possibility of an assured and permanent increase in the existing supply. This is particularly the case under the present condition of rapid and unprecedented development of all chemical industries in this country, and it is probable that in addition to the use of charcoal for the reduction of iron ore, for fuel purposes, for domestic and other uses, for the manufacture of gunpowder and explosives, for refining purposes, and for medicinal use, a number of other possibilities of consumption in general chemical manufacture remain to be developed.

Information is, therefore, now being sought from present or potential consumers of charcoal with a view to ascertaining their present consumption, the extent to which such consumption could be increased by securing a permanent source of supply at present price levels or at the reduced level which might be expected to follow on an increased production; and the particular form—*e.g.*, faggot, stick, powder, or briquette—most convenient for the special use for which the charcoal is required.

### Methods of Distillation

The particular methods of distillation employed are to some extent controlled by the products it is desired to secure, and in the case of the wood-distillation factories erected by the Government, the process employed was designed chiefly with a view to the production of acetate of lime. The broad principles, however, remain the same, and whatever the methods of treatment employed, the crude products of wood distillation, apart from the charcoal remaining after carbonisation of the wood, are gas, wood oil, wood tar, and pyroligneous liquors yielding methyl alcohol or wood spirit, acetone, acetate, &c., the proportionate yields depending largely on the slow or rapid distillation of the wood and the temperatures employed at the various stages of carbonisation.

So far as can be ascertained, no attempt appears to have been made in modern days to convert the gas production to any other commercial form, and until quite recently it has been treated as of no value and allowed to escape. Now, however, where oven retorts are in use, means have been taken to fit the retorts with suitable flues for carrying off the non-condensible gases produced in distillation, which are then led back and utilised as fuel beneath the retorts. It is stated that by this means as much as 30 per cent. of the fuel used for heating the retorts can be economised.

It is interesting to note that one of the very earliest attempts to produce a satisfactory illuminating gas, that of Lebon at the end of the eighteenth century, was a result of experiments in wood distillation, and would appear to suggest possibilities for commercial utilisation of wood gases which it would be advisable to study, though illuminating gas produced from waste wood or sawdust is extensively made use of in Canada, and also in Denmark and Sweden.

### Wood Tar Research

In many ways one of the most interesting possibilities arising out of any extensive development of a wood-distillation industry in this country might be looked for from research work directed to more thorough examination of wood tar. Hitherto, a large proportion of the production has been used as fuel for heating the retorts in conjunction with the non-condensible gases given off in distillation, and practically the only further treatment to which wood tar has been subjected with a view to its more profitable commercial use has been the separation of creosote from pitch by distillation, the latter being sometimes used as an agglutinant in briquetting charcoal, but more often disposed of for commercial use in caulking vessels and similar purposes. As, however, analysis of wood tar shows it to be composed of saturated hydrocarbons, such as benzene, toluene and naphthalene—in fact, all the substances from which coal tar or so-called "aniline" dyestuffs are built up—it would appear well worth while to investigate the possibility that in wood tar may be found a source of supply for aniline dyestuffs in a form which may conceivably throw new light upon the many problems in connection with dye manufacture still awaiting study and solution.

### Acetate of Lime

As has been said, the principal object of the Government in building factories in England for wood distillation on an extensive scale was to obtain an assured supply of acetate o lime, then being called for by the explosives branch on an ever-increasing scale. For ordinary commercial use, however, grey acetate of lime, the particular form in which it has been produced, is not an article of very large consumption in England, and it is probable that the more profitable forms in which to market the pyroligneous liquor will be methyl alcohol, acetone and acetic acid.

### Methyl Alcohol, Acetone and Acetic Acid

Owing largely to the growth of the dye industry in this country, pure methyl alcohol is in greatly increased demand, for the manufacture of the various methyl derivatives, such as dimethylaniline, methyl chloride and bromide, etc., used in making aniline dyes. It is also largely used in a cruder form as a denaturant, and for this purpose, having regard to the almost certain increase in the production of power alcohol from various vegetable and other sources, is a commodity for which the demand seems likely greatly to increase. As the raw material for the manufacture of formaldehyde also a rapidly increasing market is developing. Thanks largely to the exigencies of the situation created by the war, the manufacture in this country of this important article seems now to be established on a firm basis, and with the continued increase in the manufacture of innumerable articles of the imitation bone or horn type for domestic use the demand for formaldehyde and consequently for methyl alcohol for its manufacture is clearly indicated. In addition to these comparatively new uses of formaldehyde there is, of course, also a well established market for the commodity as a disinfectant and food preservative as well as in the photographic industry, in tanning, and in the manufacture and application of aniline dyestuffs.

During the war the demand for acetone both for use in making "dope" for the building of aeroplanes and in the manufacture of smokeless powder brought the consumption up to figures far in excess of anything previously recorded and it is, therefore, a matter of some difficulty to estimate the probable demand for it under present conditions. It is, however, an article of fairly extensive use in many industrial manufactures and the possibilities of an ultimate extension of aeroplane building for commercial purposes would in itself form a sufficient reason for ensuring a source of supply.

The uses of acetic acid are so numerous and the importation has hitherto been on a scale of such magnitude that the production of this commodity from native raw material would alone justify the establishment of scientific wood distillation on an extensive scale.

In the foregoing remarks consideration of the problems and possibilities of wood distillation in England has been confined to those aspects which particularly concern the treatment of what are known as hardwoods, the existing factories all being situated where waste wood supplies consist almost entirely of beech, oak, and, to a lesser extent, chestnut. Somewhat different considerations arise where the treatment of resinous wood, such as pine and larch, is concerned, but having regard to the re-afforestation proposals of the Government, some of which are now being carried into effect on an extensive scale, it may well be that the distillation of other woods will shortly become a practical proposition, and the utilisation of waste wood for the extraction of spirits of turpentine, rosin, etc, may afford further means of reducing the list of commodities, to be obtained from home-grown supplies of raw material, but which still continue to be imported.

---

In the *Farben Zeitung* A. Coblenzl states that the blue colour of bauxite is due to the presence of an easily oxidisable colloidal form of FeS. Similar colour appears in $BaSO_4$ that has stood for some time in moist packages, the organic matter in the water in this case having reduced a little sulphate to sulphide. The acid present in the sample has attacked the sulphide, liberating $H_2S$, which has combined with the Fe present to form colloidal FeS.

THE JAPANESE PHARMACOPOEIA, which was recently issued by the Japanese Government, adopts some native substitutes for herbs, roots or other articles of foreign origin, cinnamon bark as substitute for cassia bark, and camelia oil for olive oil. In some cases Japanese goods are used to the total exclusion of articles of foreign origin. The standard of quality is also raised, including among other articles quinine hydrochloride, acetyl-salicylic acid and diastaze.

# Safeguarding of British Key Industries

## Financial Resolutions Discussed in Parliament

On Monday in Committee of Ways and Means of the House of Commons, Mr. BALDWIN, President of the Board of Trade, moved the following resolutions :—

1. That for a period of five years from the passing of an Act for giving effect to the resolution there shall be charged on any of the following articles imported into Great Britain or Ireland a Customs duty of an amount equal to 33⅓ per cent. of the value of the article, that is to say :—

(*a*) Optical glass and optical elements, whether finished or not, microscopes, field and opera glasses, theodolites, sextants, spectroscopes, and other optical instruments ;

(*b*) Beakers, flasks, burettes, measuring cylinders, thermometers, tubing, and other scientific glassware and lamp-blown ware, evaporating dishes, crucibles, combustion boats and other laboratory porcelain ;

(*c*) Galvanometers, pyrometers, electroscopes, barometers, analytical and other precision balances, and other scientific instruments, gauges, and measuring instruments of precision of the types used in engineering machine shops and viewing rooms, whether for use in such shops or rooms or not ;

(*d*) Wireless valves and similar rectifiers, and vacuum tubes ;

(*e*) Ignition magnetos and permanent magnets ;

(*f*) Arc-lamp carbons ;

(*g*) Hosiery latch needles ;

(*h*) Metallic tungsten, ferro-tungsten, and manufactured products of metallic tungsten and compounds (not including ores or minerals) of thorium, cerium, and the other rare earth metals ;

(*i*) All synthetic organic chemicals (other than synthetic organic dyestuffs, colours, and colouring matters imported for use as such, and organic intermediate products imported for their manufacture), analytical reagents, all other fine chemicals, and chemicals manufactured by fermentation processes ;

including any articles comprised in any list which may from time to time be issued by the Board of Trade for defining the articles which are to be taken as falling under any of the general descriptions set out above.

2. There shall be charged on any of the following articles imported into Great Britain or Ireland, in addition to any other duties of Customs chargeable thereon, a Customs duty of an amount equal to 33⅓ per cent. of the value of the article, that is to say :—

Articles of any class or description in respect of which an order by the Board of Trade has been made under any Act of the present Session for giving effect to this resolution, if manufactured in whole or in part in any of the countries specified in the Order, or deemed to be so manufactured.

Any such Order as aforesaid may be made on the ground that articles of the class of description in question are being sold or offered for sale in the United Kingdom—

(*a*) At prices below the cost of production thereof ; or

(*b*) At prices which, by reason of depreciation in the value in relation to sterling of the currency of the country in which the goods are manufactured, are below the prices at which similar goods can be profitably manufactured in the United Kingdom ;

and that by reason thereof employment in any industry in the United Kingdom is being or is likely to be seriously affected.

For the purposes of this resolution, " cost of production " in relation to goods of any class or description means the current sterling equivalent of—

(*a*) The wholesale price at the works charged for goods of the class or description for consumption in the country of manufacture ; or

(*b*) If no such goods are sold for consumption in that country, the price which, having regard to the prices charged for goods as near as may be similar when so sold or when sold for exportation to other countries, would be so charged if the goods were sold in that country.

### The President's Arguments

In the course of his speech Mr. BALDWIN said that if nothing was done, he saw a great danger that inevitably there would come into this country unchecked a flood of foreign goods at prices with which for the time being it would be impossible to compete. When that moment came, whatever Government was in power would inevitably be placed in a very dangerous position. There would be a storm of protest from the manufacturing centres which no Government would be able to resist, and the result would be the worst thing in the world, legislation of a panic nature, and the Government of the day might find itself committed, in a hurry, to a scheme of Protection to which very few members of the House would give their support if they had had time to consider the matter beforehand. The list of scheduled industries had been cut down to the narrowest limits, and he believed that every man with a knowledge of British industry to-day would see that they had in the articles scheduled the main things which went to make the scientific foundation of British industry. The prospects of the chemical industry were illimitable, and its development was absolutely necessary in such a country as ours. In that industry, as developed in Germany and as it was hoped to develop it in this country, there was unlimited scope for brains. In this country our brains were as good as those of any people in the world, and we wanted to lose no opportunity of affording scope for them and making fields in which they could be exercised.

There was one peculiar feature about the dumping that had gone on under the collapsed exchanges which had been brought out by the exhibition at Millbank. Contrary to all that they were told in the text-books, it was shown that the consumer was not getting the benefit of cheap goods. The whole of the profit was going to the middlemen. They also had with regard to Germany one very peculiar feature, which had not occurred in international trade before, in that the difference between the internal and the external value of the mark gave a bounty on export. That difference was diminishing, and would, he hoped, continue to diminish. There was also this position : That whereas in the United Kingdom the position of the working man as regards purchasing power was slightly improved compared with pre-war times, in Germany he was in a worse position, and therefore there was a considerable play in wages, all of which was against this country ; but before the expiration of the three years he thought that would come to an end. He emphasised the fact that in the Bill, whatever duty was imposed with regard to the exchange, part of the dumping would only last for a maximum of three years, while in regard to key industries it would be five years. He claimed that the Bill was an honest attempt to deal with one of the most difficult and complicated situations with which the country had ever been faced.

### One Year's Protection Instead of Five

Sir W. BARTON, in moving an amendment to substitute one year for five, said that with regard to the chemical industry, the President of the Board of Trade must know that neither Protection nor Free Trade entered into the success of Germany in that particular direction. It was due to the lack of enterprise in this country that Germany held the position she did in the chemical industry. He was quite convinced that there were only two key industries in this or any other country, and these were agriculture and coal. Neither of these was mentioned in the schedule. He defied anyone to say that during another great war in the future any of the scheduled articles would be necessary. To have scheduled them was ill-advised and unjustified. The President of the Board of Trade had used a significant phrase to the effect that it might be necessary at the end of five years to extend the period. That was exactly how Protection marched.

### Sir Alfred Mond's Reply

Sir A. MOND, replying for the Government, said that there was nothing in the resolutions which was objectionable to one who really understood Free Trade and who did not mix up Free Trade with cheap goods. The free importation of subsidised foreign goods because they were cheap was the very anithesis of Free Trade. During the war we built up with great research and industry certain industries such as those scheduled. Those industries were not yet in a

position to stand on their own feet. If the matter were left to the free play of competition they would disappear. It was not true that the Board of Trade could add any number of fresh industries to the schedule. He claimed still to be a Free Trader, and he did not consider legislation against dumping any infringement of Free Trade principles. The regulations as to dumping were but the setting up of a barrier to save manufacturers from being swept away by a flood against which they could not stand up. They were necessary in order to re-establish that confidence and credit which were absolutely necessary to start the wheels of industry again. (Cheers.)

Sir W. PEARCE, speaking as a member of Lord Balfour of Burleigh's Committee on commercial and industrial policy after the war, said the report of the Committee was the basis of the Bill which was to be founded on these resolutions. There was nothing in the resolutions that contravened what really was accepted by the majority of opinion on the Committee, which declared that every one of the articles included in the schedule were absolutely necessary to be produced in this country. Circumstances had made the Committee's recommendations not less but more necessary.

Mr. BALDWIN explained that it would be found when the Bill was presented that it provided that the usual procedure would be followed under which an order would be laid before the House for 21 days, and during that time it would be possible for the House to declare the order void.

# Sir William J. Pope at the Chemical Industry Club

## A Plea for Chemical Co-operation

THE present series of monthly meetings at the Chemical Industry Club was brought to a close on Monday evening, when Sir William J. Pope, President of the Society of Chemical Industry, delivered an address to a keenly interested audience. Dr. W. R. Hodgkinson presided.

### Future of the Club

Sir WILLIAM POPE, referring to the relations between the club and the other corporate interests of chemistry as represented by the large scientific and technical societies, said he thought they were all agreed that an organisation such as that club—an institution which aimed at supplementing the rather formal scientific and technical activities of the large publishing societies by cultivating the social side of chemistry—must find a place in any comprehensive scheme for the development of chemical progress. It had been stated often that such a comprehensive scheme was required, and it had been made clear that such a scheme would succeed with the general goodwill which had been so frequently expressed. All that was now necessary to enable them to make a step in advance was the command of money for capital expenditure. Whilst it was probably unnecessary to attempt to lay before an audience already convinced fresh reasons for fusing together the social, scientific and technical interests of chemistry, a few collateral questions presented themselves which were well worthy of consideration and discussion.

### The Federal Council

"We have founded in this country," Sir William Pope said, "a Federal Council for Pure and Applied Chemistry with the avowed purpose of more firmly binding together all the interests of chemical science; the establishment of this organisation here has been followed by the creation of similar organisations in most of the allied nations. These national councils are now joined together as an international council for chemistry, and this forms one branch of the great international Research Council which seeks to bind together all the natural sciences in one large organisation. It cannot be claimed that any either of the smaller or of the larger bodies thus brought into being have as yet achieved large direct objects. The movement has, however, had one result which may in the long run prove of far greater benefit to science than could any more spectacular success. It has created what may be called an atmosphere of co-operation, and in every country embraced by the international chemical council avenues are being explored for the purpose of establishing new points of contact between, and for associating more closely for the common good, all our large chemical societies. We see this here in the inquiry now in progress as to the possibility of some co-operation in publication, and in the attempt towards joint working of provincial sections, by the Chemical Society and the Society of Chemical Industry. The atmosphere created by our national councils is thus exercising a marked effect in facilitating the working of our scientific societies; we may confidently anticipate that when financial support becomes available progress towards greater unification of effort will become more rapid.

"The attempt to secure more intense co-operative effort amongst our chemical organisations seems to have aroused no opposition; it appears to have been generally accepted that the principle of co-operation is sound and every encouragement, except, perhaps, the financial one, has been given to the operations of the Federal Council for Chemistry. This has not been the case in connexion with the effort to secure closer co-operation between the various interests in other sciences. It is very noteworthy that the British representatives of certain sciences have declined to associate themselves with the post-war movement for allied co-operative effort. The biologists appear to have held aloof, and their case seems to be stated with some obscurity in an article in the *Times* of March 8 last, whilst the mathematicians are not unanimous, as is shown in a letter in *Nature* for March 24.

### A Better Understanding

"The readiness with which chemists have accepted the movement towards co-operative effort is in striking contrast with the divergence of opinion expressed by practitioners in certain other sciences; a little reflection upon the whole question of the desirability of combined effort in scientific subjects seems necessary.

"During the four years of the war, chemists of the most widely different types were brought into very intimate association; many of the most academically minded members of the chemical teaching profession were forced to work in touch with chemical technologists and chemical engineers who had little respect for learned dilatoriness or theoretical principles but whose whole attention was directed towards carrying out some specific piece of work. Such queerly assorted co-operative workers always succeeded in achieving their object many months after scheduled time and at somewhat excessive cost; most of them were impressed, I presume, by the conclusion that a better understanding between all the parties concerned was highly desirable and would have facilitated materially the carrying out of the common task. Long before the war, we all were convinced that certain great chemical questions, such as the determination of atomic weights and many other obvious problems which called for the minute and critical attention of men of diverse talents, were best advanced by co-operative effort. We realised, in fact, that combined effort directed towards the solution of certain difficult but otherwise straightforward chemical problems sets at liberty much creative talent for the development of our subject in other directions. Co-operative effort by chemical experts, whether for the compilation of compendia, the determination of fundamental constants, or the foundation of a British coal-tar colour industry, is as essential to progress as is co-operation in the running of railroad or steamship services. If our great chemists of the past, men like Davy and Faraday, had not been relieved from the necessity of performing for themselves all those duties which make uncivilised life so burdensome and monotonous, they would certainly have never found time to contribute anything to science.

### A Programme for the Club

"It is impossible for a number of men engaged in the various branches of chemistry to meet socially in such a club as this

without becoming increasingly impressed by the need for solidarity of action and without realising more and more that progress in one branch of the subject is sooner or later reflected in the development of all the other sections. The Club has a unique purpose to serve in connexion with the knitting together of the different interests, each of which is represented by one or other of our scientific and technical organisations. It provides a meeting ground upon which a chemical public opinion can be created and where the younger men will learn, more advantageously than anywhere else, that they also form a part of the body corporate and that they take must a share in the responsibilities of our profession.

"In this respect, the practice which has been introduced of holding more or less informal discussions in the Club upon matters of general importance to chemists is likely to prove a very useful one and I think that most of us would like to see it extended. Many topics are always with us which would be far more profitably discussed in the Club room than in one of our specialised societies. The question of the training of a technical chemist is one of these; this subject is often discussed in meetings of the Society of Chemical Industry, but here the atmosphere is too technical and the academic chemist, who after all has to lay the basis of a chemist's training, is apt to feel that he hardly gets a fair show. In this room all interests could meet on a common ground and the difficulties of training a technical chemist from the academic and the technical sides could be made clear. At present neither side, either in pure or applied chemistry, really understands the difficulties of the other; the technical chemist knows nothing about teaching work and is apt to think that the defects of the young men sent to him from teaching institutions arise from faults in methods of training, whilst the teacher knows that it is not possible to make a silk purse out of a sow's ear.

"I remember listening to the reproaches of a very successful consulting chemist some time ago concerning the unsatisfactory type of college trained man he was getting in his laboratory. He complained that the young men sent to him were not first class analysts, were unable to grasp quickly the technical problems placed before them, were devoid of business sense and aptitude, and made a poor impression on visitors. My friend did not realise that qualities such as these need many years for development, that their possession had made him a successful man, and that if our teaching institutions sent him young men possessed of these endowments they would very quickly become the proprietors of the business. Another old very successful technical chemist of my acquaintance, unhappily no longer with us, was profoundly convinced that a works chemist ought to be able to read the old Greek authors fluently; his conviction apparently arose from the fact that he was at the same time an excellent works chemist and an excellent classical scholar.

"Another question which might well be ventilated in this Club is that of the professional organisations which it is desirable to maintain for the protection of the chemist. Certain associations have been set up which are of the nature of trade unions for scientific workers; is it desirable that these should be supported? My own view is that chemistry is inherently a professional subject, and that any attempt to organise chemists in the way in which skilled trade labour is organised will be detrimental both to the chemist and to chemical science and practice; at the same time, argument is possible on both sides, and it would be useful to obtain a clear view over the whole question by a Club discussion.

"Again, it has been often suggested that we ought to secure a representative of chemistry in Parliament. Parliament exists for the purpose of representing the interests of the whole community, and not those of any particular section. The Universities have direct representation in Parliament, and I am inclined to believe that they would fare much better at the hands of the State if they had not that representation. The matter is worth discussion in the Club; if we decided that we really need a representative of chemistry in the House of Commons, we ought to be able to secure one."

In conclusion, Sir William Pope emphasised the essential need of all sections working heartily together for the central object before them all—namely, the advancement of chemical science and chemical industry in this country. The more they knew of one another, and the more they met together in co-operative work, the better it would be for everyone. For that reason he was most agreeably surprised a year or two ago to hear that that Club had been founded. At the time it was an experiment, but it had met with a remarkable measure of success, and he hoped that that success would continue to grow. (Applause.)

An interesting discussion followed in which Dr. Ormandy, the chairman, Mr. W. E. Coley, Mr. Bernard Davis, Mr. Collett, Mr. Brewis and Mr. Pilcher (registrar of the Institute of Chemistry) took place.

### Burlington House

In replying to various points raised and particularly to the question whether an extension of the Club's activities would be welcomed by the various societies, Sir WILLIAM POPE said that the members might dismiss from their minds any thought of coldness towards the Club. Burlington House had been described by one speaker as a refrigerating chamber, but he had heard Dr. Ormandy speak there, and his attitude did not suggest a low temperature. (Laughter.)

Dr. ORMANDY: I was trying to thaw it.

Sir WILLIAM POPE said that as regards the older societies they took the Club in their stride; in view of its success it must be treated as a serious factor. His view of the attitude of the Federal Council was that any organisation prepared to do anything for the advancement of chemistry in any direction would certainly have their assistance and approbation. In his opinion the Club could do very useful work in organising such a series of discussions as had been suggested. No fear need be entertained that there was going to be any feeling of jealousy or any idea that the Club was usurping the functions of any other body. They were all out for improving the position of chemistry as a whole, and any person or any body which aimed at assisting that great end could certainly count on the approbation of the existing societies.

## Foundry Problems

### Educational Work of the Institute

At a meeting of the Lancashire Branch of the Institution of British Foundrymen, held on May 7, a paper was read by Mr. T. G. Hilton, of Rosegrove, upon "Some Experiences with Core Sands." In this he dealt with the commoner and cheaper varieties of core binders, such as flour, resin, oil gum, as apart from the commercial compounds sold by foundry supply firms, and also gave the proportions of sand mixtures used by him in making cores for jobbing work. He said sea or river sand, with linseed oil as binder, was recognised as one of the finest mixtures for most classes of light or medium work, but owing to the high cost of the oil, particularly from the beginning of the war, it was seldom used in small foundries. One big disadvantage, where it was used on a large scale, was the generation of noxious fumes, and there was also a tendency for the great heat of the liquid metal to burn out the oil binder and allow the sand to crumble.

Cores made with a flour binder should not be allowed to remain in the mould for any length of time, as they absorbed moisture very rapidly and a fungoid growth appeared on the surface. In his opinion core gum, which really came under the head of commercial compounds, was the best binder for small jobbing work, owing mainly to its cheapness and the ease with which it could be employed.

In the course of the discussion emphasis was laid upon the importance of a proper method of mixing and the regulation of the temperature. The Chairman (Mr. W. Meadowcroft) said there was a great opening for an efficient oil sand core mixer which would thoroughly mix the sand up without bruising it.

The President of the Institution, Mr. Riddeli, of Glasgow, was present during the proceedings, and gave a short address in which he pointed out the importance of the educational work done by the Institution. It was of a voluntary nature, intended to meet the needs of men who appreciated the difficulties of their occupation and were anxious to solve them. It contrasted favourably with the general educational system of the country and was more likely to produce valuable results.

IMPORTS OF GLYCERINE into South Africa during 1920 amounted to 11,328,233 lb., as compared with 2,966,929 lb. during 1919. Imports of soap totalled 3,783,611 lb. in 1920, as compared with 1,286,235 lb. in 1919.

## Society of Chemical Industry

### Manchester Section

AN interesting item of information was communicated to the Section by Mr. J. Huebner (Director of the Dyeing and Papermaking Department of the Manchester College of Technology) with respect to the importation of woad into this country many years ago, and served to show in what extraordinary ways history repeats itself.

Mr. Huebner pointed out that the prohibition of the importation of dyestuffs from foreign countries was no new departure, and that such a practice could be at least dated back to the 15th century. He had discovered a curious and interesting illustration of this fact among the Harleian manuscripts in the British Museum, which took the form of a special license granted and signed by Henry VII, for the importation of 230 tons of woad by Alonzo de Burgues of Toulouse. The license was given in Greenwich, and was dated 8th July, 1490.

It was, of course, well known that woad grew in this country in very early times, but no attempt was made over a very considerable period to cultivate the plant as a dyeing material. On the other hand, woad was specially grown in France and Germany, for dyeing purposes, as early as the 12th century, and probably before that, though Mr. Huebner had as yet failed to discover any authentic earlier records of its cultivation. The industry became one of considerable importance, particularly in Thuringia, and an old Saxon historian had written concerning it as follows: "This dyeing weed woad trade is, so to speak, the Golden Fleece of the land of Thuringia, because it is sent and used in all the countries, near and far, and much wealth is derived from it. It would be, therefore, quite appropriate if our Judges imitated the gentlemen in the English Parliament, who, as I have seen myself, sit on woolsacks, and if they upholstered their armchairs with woad instead of wool."

Serious attempts were made in England during the 15th century to grow woad. The continental woad growers were quite willing to supply the English growers with seeds, but, before dispatching the same, they took the special precaution of either boiling them in water or smoking them in chimneys, so that when they arrived in England they failed to germinate. It was nevertheless considered necessary at that time to prohibit the importation of woad both from France and Germany.

### Works Accounts from the Chemist's Point of View

Mr. R. CURTIS, M.Sc., in reading a paper on the above subject, said that an efficient system of works accounts whereby the manufacturing costs could be accurately detemined was an essential part of modern commercial methods. Chemical works had no doubt lagged behind engineering works in this respect, but thanks to the excellent work carried out in this connexion during the war by the Department of Explosives Supply, most chemical works had now fairly efficient costing systems.

In many cases, however, the importance of costing as an aid to efficient works management was not properly appreciated. It was from this standpoint that the technical or works chemist was concerned. He asked for (1) A detailed analysis of all manufacturing costs; (2) The information to be available at the earliest possible moment. Costing information supplied two or three months after the expenditure had been incurred had lost to him the greater part of its value.

As illustrating the type of system required by the works chemist, the author gave particulars of the method instituted at H.M. Factory, Avonmouth. Here the costing system was so arranged that an analysis was made daily of the previous day's expenditure. This was issued in the form of a daily "cost sheet," from which the chemist could see what had been spent on raw materials, labour, maintenance and repairs, stores requisitions, W.S.P. services and overhead charges.

---

The Californian Fruit Growers' Exchange is carring out research work in connexion with the UTILISATION OF ORANGES AND LEMONS which are not of the highest quality for eating purposes, but are yet rich in oil, citric acid and other products.

The first aerodrome in Alberta, which is being erected at Morley, is almost completed. It will be the headquarters of a forest patrol staff, and contain six machines. The work of mastering fires will be performed with BOMBS CONTAINING CHEMICALS, which will be dropped from the aeroplanes.

## Synthetic Resins and Varnishes

*To the Editor of* THE CHEMICAL AGE

SIR,—The Electrical Research Association is actively interested in furthering the manufacture and use of electrical insulating materials made from synthetic resins and varnishes, and having the well-known heat resisting characteristics associated with some of these materials.

Leading manufacturers and users of the raw materials and finished products are already co-operating, and it is hoped that you will be so good as to insert this letter in your journal, so that persons not already in touch with the work may have the opportunity of communicating with the undersigned.—Yours, etc.,

E. B. WEDMORE,
Director and Secretary British Electrical and Allied Industries Research Association.

19, Tothill Street,
Westminster,
S.W. 1.

---

### Fuel Efficiency

AT a meeting of the Metropolitan Technical Section of the Local Government Officers' Association at Caxton Hall, on Tuesday, Mr. E. W. L. Nicol, Engineer and Fuel Expert to the London Coke Committee, said that probably the most significant feature of these recurring wages disputes in the coal mining industry was the fact that the winning of coal in this country tended to exceed its commercial value as fuel.

There was however, a remedy. Coal was something more than mere fuel, and in addition to increasing the output, the real and lasting solution of the wages problem lay in making it yield a greater contribution towards national wealth. Coal must no longer be regarded as a fuel, but as a raw material, from which fuel among other things could be produced. Coal consumption per unit of production must be reduced by adopting more efficient methods of use; and in order to help pay the increased price, the valuable chemical products of coal must be recovered, as far as possible, before using it as fuel. The gain to the nation that would accrue from the carbonisation of the coal now used in the raw state should not only enable a satisfactory standard of wages and profits to be established and maintained in the mining industry, but the smoke nuisance, with all its attendant evils, would also be abolished.

---

### Birmingham University Chemical Society

ON the afternoon of May 4, Professor G. T. Morgan, F.R.S., and members of the Birmingham University Chemical Society paid a visit to the brewery of Messrs. Flower & Son, Ltd., at Stratford-upon-Avon. Under the guidance of Mr. F. L. Talbot, a director, the party visited the power house and then proceeded to the malting house, where the pneumatic process of treating the barley was explained. The next stage which was shown was the heating of the barley to destroy germination. The grain was here found to have acquired a sweet taste due to the maltose which had been formed during the preceding stage.

The party inspected the large mash tuns, and then proceeded to the fermentation house. Here the wort is allowed to ferment in large vats above which were suspended copper cooling coils. The latter could be lowered into the vats should the temperature of the fermenting liquor rise above a maximum. The beer, after having the yeast removed from the surface, was conveyed into mains which ran down into cellars where the bottles and casks were filled.

---

### Divisional Court Dismiss an Appeal

IN the King's Bench Divisional Court on Tuesday, before Justices Bray and Bailhache, the case of Bourgeois *v.* R. W. Greeff & Co. was argued on the latter's appeal to set aside an umpire's award. After hearing evidence for the appellants the Court decided to dismiss the appeal.

---

A Central News message from New York states that a "gas mask" for the protection of a battleship from the poisonous fumes of an enemy was suggested by Professor W. Lee Lewis, head of the chemistry department of North-Western University and INVENTOR OF THE DEADLY GAS "Lewisito," perfected at the close of the late war.

## Society of Public Analysts

THE ordinary meeting was held on Wednesday week at the Chemical Society's Rooms, Burlington House, Mr. Alfred Smetham, President, in the chair. Certificates were read for the first time in favour of Mr. W. N. Stokoe, B.Sc., A.I.C., and Mr. J. F. F. Rowland. Certificates were read for the second time in favour of :—Messrs. William Ellard Woolcott and Thomas Henry Pope, B.Sc., F.I.C. The following were elected Members of the Society :—Messrs. Percy Nicholas Mould and Walter Joseph Wright, F.I.C.

### Abstracts of Papers

In a paper on "Detection and Estimation of Illipe Nut Fat used as a Substitute for Cocoa Butter," by Messrs. Francis C. H. Tate and John W. Pooley, attention was drawn to the close similarity of the various physical constants of cocoa butter and Illipe nut fat, and the consequent difficulty of detection and estimation. A method was suggested involving the combination into one factor of the following constants :—Densities at 60°/15·5°C. and 99°/15·5°C. ; melting points in °C. of the fat and fatty acids ; viscosity at 60°C. ; iodine value. The combined factor was obtained by multiplying together the factors in which the average constant for cocoa butter was lower than that for Illipe nut fat, the product being multiplied by the reciprocal of the only constant in which cocoa butter was the higher, *i.e.*, the iodine value. From the average multiple factors thus obtained for the two fats, the composition of any mixture was calculated. For approximate estimation when only small quantities were available a method was suggested involving the use of the melting points of the fat and the fatty acids and the iodine value.

In "Some Notes and Demonstration on Apparatus for Determining Hydrogen Ion Concentration," by Mr. G. W. Monier Williams, it was stated that the determination of hydrogen ion concentration, or absolute acidity, by the potentiometer method, had not come into general use in analytical laboratories, chiefly owing to the cost of the electrical measuring instruments usually considered necessary. For work of the highest accuracy such apparatus was indispensable, but it was possible, for a very moderate outlay, to obtain results comparable in point of accuracy with ordinary titration methods. An apparatus of this nature was demonstrated, and the theory of the method and its application to analytical work discussed.

Mr. Ernest Paul, in "A Note on the Oil of Oats," examined the petroleum ether extract obtaned by extraction of whole ground oats of the variety "Black Tartary." The extract was found to contain some lecithins, and analytical constants are given for the separated oil.

Mr. H. Atkinson, in a paper on "Estimation of Potassium in presence of Sodium, Magnesium, Sulphates and Phosphates," explained that the method depended upon the relative solubilities of these salts and the perchlorates of the metals in methyl alcohol. Potassium perchlorate had a low solubility in the liquid, while the perchlorates, sulphates, and phosphates of magnesium and sodium had a sufficiently high solubility to make the separation possible. Details of procedure were given and results of various tests.

### Paper Pulp from India

Mr. WILLIAM RAITT, cellulose expert to the Government of India, in a paper on "Paper-pulp Supplies from India," read before the Indian section of the Royal Society of Arts, last week, said that when the paper shortage began to be threatened some fifteen years ago it was stated that paper could be made from any vegetable substance ; but considered as a practical contribution to a difficult problem this was misleading and fallacious. From the investigations of the Indian Forest Research Institute only two small groups which were economically sound had been found. These were bamboos and a few Savannah grasses. It was a modest estimate to say that from bamboo, taking only that available under possible manufacturing conditions, Burmah, Bengal, and South-West India could produce 10,000,000 tons of pulp per annum, and Assam, from Savannah grasses, 3,000,000 tons. India could therefore produce pulp for the whole world, and the prospects were that bamboo unbleached pulp could be delivered in this country at a cost not exceeding £16 to £18 per ton.

## Thermal Losses in Producer Plant

AT a meeting of the London Section of the Society of Chemical Industry held at Burlington House, Piccadilly, on May 2, Mr. E. V. Evans in the chair, a paper on "Thermal Losses in the Gas Producer Process," was read by Mr. N. E. Rambush.

The paper dealt with the causes of thermal losses in producer gas plants. The points to be generally considered when estimating the anticipated thermal efficiency of the gasification of any particular fuel were detailed as follows : (1) Moisture content in fuel ; (2) nature of volatile matter in fuel ; (3) grading of fuel ; (4) soot formation ; (5) ash content in fuel ; (6) the radiation and convection heat losses from the producer proper to the atmosphere ; (7) gas leakage losses ; (8) losses in washing liquors ; (9) moisture content in gas ; (10) the temperature of and sensible heat contained in the hot gas leaving the producer. A number of curves and tables were exhibited dealing with all these points.

Dust and soot losses were attributed to high gas velocities and high temperatures, and it was shown how these losses may represent as much as 3 per cent. of the heating value of the fuel. The higher the ash content in the fuel, the higher would be the percentage of carbon in the ashes, hence the unburnt fuel loss was cumulative in regard to the ash content. Again, leakage losses due to poking, cleaning and leaky joints might be at least 1 per cent. of the heating value of the fuel gasified, and the losses in the cooling and cleaning plant were divided into mechanically carried away gas, and gaseous or tarry matters dissolved in the washing liquor. Such losses, in turn, might be as much as 1 per cent. of the heating value of the fuel. The content of the water vapour in the gas was mainly due to undecomposed steam from the blast, the amount of steam decomposed depending upon the time factor. Finally, it was pointed out that the greatest cause of thermal loss was generally that amount of heat carried away by the hot gases from the producer.

A discussion followed in which the chairman, Capt. C. J. Goodwin, Dr. Travers, Mr. W. A. Tookey, Mr. Parrish, Mr. A. H. Lymn, Dr. Lessing, Dr. Stephen Miall and Dr. H. G. Colman took part.

### German Reparation Act

THREE new orders have been issued (Nos. 8, 9 and 10), extending the period of exemption of certain imported articles from May 15 to June 15.

No. 8 order exempts any article imported before June 15 respecting which a contract was entered into before March 8 and which (1) is essential for the completion and working of machinery or plant which was partly delivered before March 8, 1921, and which cannot be used without such article ; or (2) is to replace an essential part of German machinery which was installed in the United Kingdom prior to March 8, 1921 ; or (3) respecting which patterns, drawings or designs for the manufacture of such article to the value of not less than 20 per cent. of the value of all articles to be manufactured under the contract were sent to Germany before March 8, 1921.

No. 9 order exempts altogether any article sent from the United Kingdom to Germany and returned from Germany to the United Kingdom unaltered, provided that the property in the article still remains in the original British consignee.

No. 10 exempts any article imported before June 15 provided that a contract was entered into before March 8 and that a sum of not less than 20 per cent. of the purchase price was irrevocably paid before March 8.

### Carnegie Research Scholarship

At the annual meeting of the Iron and Steel Institute on May 6, it was announced that under the ANDREW CARNEGIE RESEARCH SCHOLARSHIP the Council had awarded £100 to Dr. L. Aitchison to assist him in carrying out an investigation of the low apparent elastic linmit in quenched and work-hardened steel. Mr. C. O. Bannister and Mr. F. C. Langenberg were each awarded £100, the former to carry out research work concerning the mechanical properties and heat treatment of very low carbon high chromium steels, and the latter for research in impact testing. An award of £50 was also made to Mr. J. N. Greenwood to study the question of obtaining optical data on steels and steelmaking materials.

# The Case for Chemical Warfare

### "Daily Telegraph" on Sir William Pope's Article

THE article on "Chemical Warfare" by Sir William Pope, published in THE CHEMICAL AGE of last week, has attracted wide-spread attention in the daily press. On Wednesday the "Daily Telegraph" discussed the matter fully in a "long" leader. Without definitely taking sides, it states that the "article is one which deserves not only the attention of our own Government, but careful consideration by the Council of the League of Nations. He has drawn the controversy down from the realms of sentiment to the plane of reason." After dealing in general terms with the introduction of poison gas in warfare, the "Daily Telegraph" states :—

"In the person of Sir WILLIAM J. POPE, F.R.S., D.Sc., there has arisen a defender of the employment of poison gas. He speaks with authority, for he is Professor of Chemistry in the University of Cambridge; he has served as president of the Chemical Society; and he is now president of the Society of Chemical Industry. He has presented the case for poison gas in a closely-reasoned article in THE CHEMICAL AGE, his text being the protest made towards the close of 1915 by eight medical men qualified to speak for their profession—the presidents of the Royal Colleges of Physicians of London and Ireland, the Royal Colleges of Surgeons of England, Edinburgh, and Ireland, and the Royal Faculty of Physicians and Surgeons of Glasgow, together with the Regius Professors of Physics in the Universities of Oxford and Cambridge. They urged that the Comity of Nations should prohibit chemical warfare. It was declared that 'the use of gas is self-condemned for the following reasons: It is an uncontrollable weapon, whose efforts cannot be limited to combatants; it is an "unclean" weapon, condemning its victims to death by long-drawn-out torture; it opens the door to infinite possibilities of causing suffering and death, for its further development may well lead to the devising of an agent which will blot out towns, and even nations.' Sir WILLIAM POPE traverses all these statements and their implications, and stoutly holds that 'poison gas is far less fatal and far less cruel than any other instrument of war.' It is impossible to follow in a limited space his line of argument or to quote the interesting statistics which he gives. His contention is that poison gas is responsible for many casualties and few deaths, and that it is therefore a merciful agent. 'Amongst the "mustard gas" casualties the deaths were less than 2 per cent., and when death did not ensue complete recovery generally ultimately resulted. It is unnecessary to dwell upon this merciful result in its contrast with the proportion of deaths among the casualties from projectiles, and with the numbers of maimed, crippled, and shell-shocked we see around us every day. Other materials of chemical warfare in use at the Armistice do not kill at all; they produce casualties which, after six weeks in hospital, are discharged practically without permanent hurt.' In the opinion of Sir WILLIAM POPE, the knowledge that 'the French, Americans, and British had in sight an overwhelming production of this formidable substance was a large factor in determining the Armistice.'

"This champion of chemical warfare advances the interesting theory that 'preventive medicine' which was first employed effectively in the late war, was responsible for far more 'long-drawn-out torture' than poison gas. It acts, he suggests, as 'the super-gamekeeper; it preserves the game for the legitimate sportsman, and hence is held in esteem.' Not only were the vast armies—far faster than ever before—kept alive to go on fighting, but epidemic diseases were disseminated among the civil population. 'We see at the present moment,' Sir William remarks, 'large tracts of Europe and Asia famine-stricken, with a mortality of thousands per day, as the direct result of the efficiency of preventive medicine in keeping the whole man-power of a great part of the world under arms for so long a period. This is, again, the responsibility of the military medical services. In fact for each soldier kept in the field by the Army medical services, ten or twenty non-combatants died, and hosts more will die, many by "long-drawn-out torture."'

"Sir William Pope has brought clear thinking to bear on the problem presented by the various agents of warfare. His article is one which deserves not only the attention of our Government, but careful consideration by the Council of the League of Nations. He has drawn the controversy down from the realms of sentiment to the plane of reason. That Sir William Pope has, in a sense, made an ex-parte statement goes without saying, since he is president of the Society of Chemical Industry, but that in no way vitiates the case which he has presented as forming a basis for future deliberation. The nations of the world have to come to a decision on this matter. It is no good indulging in sentiments which will not stand the strain of warfare or drawing up agreements which will not be kept. The subject is of enormous importance, and we ought to know where we stand in view of the possibilities of the future."

# Oxide Plant Dispute

### Chemical Manufacturers' Appeal

IN the Appeal Court on Monday Keeling & Walker, Ltd., chemical manufacturers, of Fenton, Stoke-on-Trent, appealed against an order of the King's Bench Divisional Court and a judgment of the Official Referee disallowing their claim against The Sturtevant Engineering Co., Ltd., of Queen Victoria Street, E.C. (*see* THE CHEMICAL AGE, November 20, 1920, page 563, and February 19, 1921, page 224), for damages for the alleged failure of a zinc oxide recovery plant supplied by them.

According to the statement of claim defendants agreed in June, 1918, to supply and erect at defendants' premises an oxide recovery plant required for the manufacture of zinc oxide for the sum of £2,725. It was understood that the plant was to collect 250 lb. of fume per hour, but plaintiffs alleged that the plant wholly failed to collect oxide at the promised rate, and they accordingly claimed £8,525 damages.

For the defence is was contended that the claim was barred by the terms of the contract, which was one merely for the sale of goods to be returned if not satisfactory.

Mr. Maddocks, K.C., for appellants, said that in the courts below, the respondents did not call any evidence but merely claimed that under the terms of the tender they were exempt from liability. Their contention was that the contract was merely for the sale of goods whereas the appellants' contention was that it was for work and labour. The respondents had to supply fans and other plant while the appellants had to make their buildings suitable and supply a furnace and concrete foundations. It was suggested by respondents that the plant would produce two tons of oxide per day and therefore he (counsel) contended that the contract was one for a given result and for work and labour and not merely for the sale of goods.

Sir Malcolm Macnaghten, K.C., for the respondents, said they were quite willing to put the plant right, but the appellants would not let them. They, of course, admitted that they had to return the purchase price, but as the appellants had cut up the cooling plant there should be some deduction on that account.

Mr. Maddocks contended that the condition in the contract relied upon by the appellants could not apply in this case. They could not take back that which they had contracted to supply, for it consisted of design and labour as well as plant.

Lord Justice Bankes, in giving judgment, held that the appellants were bound by the terms of the contract and therefore the view of the Official Referee that the respondents were entitled to succeed was right. The Divisional Court agreed with the view, but, holding that there was more than one contract and that different considerations might apply as to the cooling plant, they referred the matter back to the Official Referee. The whole bargain, however, had always been treated as one. As the respondents had taken back the suction plant they were under no obligation to pay damages, but must return the price. Thus the judgment of the Official Referee must stand as to the suction plant, while, as to the cooling plant, if the parties could not come to an agreement the matter must go to the Official Referee.

A general meeting of the members of the Royal Institution was held on Monday afternoon, Sir James Crichton-Browne, Treasurer and Vice-President, in the chair, Mr. W. E. Watson Baker, Dr. R. Langdon Downe, Mr. R. W. Paul, Mr. A. S. Tabor, and Mrs. S. S. Williams were elected members. Sir J. J. Thomson was elected Honorary Professor of Natural Philosophy, and Sir Ernest Rutherford, Professor of Natural Philosophy.

# April Trade Returns

## The First Effect of the Coal Strike

As must have been expected, the Board of Trade returns for April reflect the grievous blow to our foreign trade by the present industrial crisis, reinforcing the already existing world-trade depression. Unfortunately, the full effects of the coal stoppage are not yet apparent, but the April figures are sufficiently significant to indicate how heavy is this additional handicap imposed on our industries. In a few cases falling prices are probably beginning to make their mark on the value of our foreign trade, but as to the major causes of the decline there can be but little doubt.

The imports during April were £89,995,504, as compared with £167,129,955 a year ago, £117,050,783 in January, 1921, £96,973,711 in February and £93,741,654 in March. The April exports, valued at £59,867,585, similarly compared show the following figures respectively: £106,251,692, £92,756,094, £68,221,731 and £66,808,961. Re-exports at £8,523,662 show a decrease of £11,883,757 on the previous year's figure. It will be observed from the figures given above that both imports and exports were lower than the remarkably low figures for March, the former by £3,746,000 and the latter by £6,941,000.

### Dyes and Dyestuffs

Imports of dyes and dyestuffs, which showed a more or less general increase in March, are lower than in March, with the exception of cutch, which shows an increase of 514 cwt. No intermediate coal tar products (including aniline oil and salt, and phenyl glycine) were imported, as against 563 cwt. in March. Alizarine was imported to the extent of 419 cwt., as against 1,485 cwt.; synthetic indigo 21 cwt., against 1,805 cwt.; indigo (other sorts) 1,466 cwt., against 5,952 cwt.; and natural indigo nil, as compared with 42 cwt. The value of these imports is given as £94,056, as compared with £226,768, the value of the March imports.

The exports (which are only shown under the headings products of coal tar and other sorts) totalled 12,134 cwt., valued at £171,262, being made up of 9,816 cwt. of the former and 2,318 of the latter. Compared with the March figures, coal tar products show an increase of 628 cwt., while other sorts show a decrease of 2,062 cwt.; the value is £20,973 less.

### Chemicals

Sodium nitrate imports, which dropped from 133,664 cwt. in February to 58,079 cwt. in March, nearly touched the former figure at 114,249 cwt. Calcium carbide at 55,726 cwt. showed an increase of 8,040 cwt. on the previous month's imports, while other articles showing a further increase (March figures in parentheses) were: Acetic acid (including acetic anhydride), 132 tons (51); borax, 1,520 cwt. (1,059); crude glycerine, 5,402 cwt. (3,865). Decreases were observed in tartaric acid, 1,169 cwt. (2,083); bleaching materials, 790 cwt. (811); distilled glycerine, 85 cwt. (341); red lead, 1,063 cwt. (2,176); potassium nitrate, 5,839 cwt. (12,716) and sodium compounds other than nitrate, 3,329 cwt. (6,885).

Exports of chemicals totalled £1,648,195, as compared with £1,921,806 in March, £2,000,552 in February and £3,386,148 in January. Exports of chemicals were generally higher than March exports, the following chemicals showing increases in quantity (the amount of increase is shown in parentheses): Sulphuric acid, 6,565 cwt. (1,046); anthracene, 14 cwt. (14); carbolic acid, 3,446 cwt. (528); naphtha, 1,381 gallons (793); naphthalene, 5,799 cwt. (3,904); coal tar products (other sorts), 30,603 cwt. (7,349); glycerine crude, 6,348 cwt. (4,648); glycerine distilled, 4,193 cwt. (891); potassium chromate and bichromate, 737 cwt. (558); sodium carbonate (including soda crystals, soda ash and bicarbonate), 144,171 cwt. (17,078); caustic soda, 38,612 cwt. (9,166); chromate and bichromate of soda, 2,157 cwt. (381); sodium sulphate (including salt-cake), 48,168 cwt. (20,843); and sodium compounds, other sorts, 40,466 cwt. (4,738).

Exports showing decreases on the March shipments (amount of decrease in parentheses) were: Tartaric acid, 514 cwt (714); ammonia chloride (muriate), 108 tons (28); sulphate of ammonia, 7,422 tons (11,197); bleaching powder, 16,790 cwt. (4,187); benzol and toluol, 580 galls. (4,664); tar oil, creosote, &c., 1,769,026 galls. (799,333); sulphate of copper, 5,423 tons (8); potassium nitrate, British prepared, 605 cwt. (152); and zinc oxide, 24 tons (27).

### Coal and Scientific Glassware

During April coal to the extent of 606,548 tons, valued at £1,309,817, was exported; in the corresponding month last year the quantity exported was 1,995,895 tons. In February the tonnage was 1,729,148, and in January 1,700,106. All the foregoing figures, however, fade into insignificance when compared with the exports in April, 1913, which stood at 6,350,869 tons. The total exports for the past four months fall short of this figure by 346,989 tons.

Scientific, illuminating, optical, &c., glassware was imported to the extent of 30,493 cwt., valued at £150,444 as against 40,757 cwt., valued at £202,597 in March. Exports under this heading amounted to 4,019 cwt. of the value of £60,583; the previous month's total was 3,535 cwt., valued at £52,614.

An interesting feature of the month's imports is presented by the record of our purchases of oil fuel. Of the total of 89,218,445 galls. of petroleum brought into this country during April, 46,588,689 galls (over half), was fuel oil. For the first four months of the year the quantity of petroleum imported was 337,440,477 galls., or 87,665,209 galls. more than in the similar period of last year.

# Russian Chemical Industry

## Present Output Practically Nil

A RECENT description of the state of chemical industry in Russia gives a very discouraging picture of the chemical manufacturing situation. With its immense coal reserves and salt deposits the Donetz basin is the natural seat of such an industry in Russia although there is an unfortunate scarcity of sulphur ore throughout the region, except in mixed deposits which, however, yield a fairly rich sulphur ore.

Before the war there were extensive alkali works and acid factories in the Donetz basin in addition to glass works and porcelain factories as a rule attached to the metallurgical works; there are now five cement factories, which could be made to produce 1,200,000 barrels of cement a month.

At the coking works the recovery of by-products grew very rapidly during the war, although the installation of recuperative furnaces increased but slowly before it. Beginning with the year 1915 a great change set in regarding coking and by-product recovery; whereas in 1913 only 12,500 poods of crude benzol were recovered from the coking furnaces, the quantity recovered in 1917 amounted to 1,040,000 poods; but the revolution prevented any further development. A great drawback to the industrial development of the Donetz basin, and with it the chemical industry in particular, was the number of times the territory changed hands since 1917.

The chemical industry is now practically non-existent, as is shown by the fact that the only chemicals produced between June and July, 1920, were calcined soda, caustic soda, pitch and explosives.

### Science and Soil Problems

THE Faraday Society is organising a general discussion on physico-chemical problems relating to the soil to be held during the afternoon and evening of May 31 in the rooms of the Chemical Society, London, and presided over by Sir Daniel Hall, Chief Scientific Adviser to the Ministry of Agriculture. The discussion will be opened by Dr. E. J. Russell, director of the Rothamsted Experimental Station, who will give a general survey of the subject. A series of Papers dealing with soil moisture, organic constituents, adsorption, and colloidal phenomena will then be put forward as a basis for discussion. It is expected that among those present will be Professor Sven Oden, of the University of Upsala.

### Italian Nitrogen Problem

ON the initiative of the Societa di Chimica Industriale, the nitrogen problem is receiving careful attention in Italy. The Italian Government took the matter up and recently appointed a Commission consisting of scientists, manufacturers and officials to study the problem from all points of view.

A Commission, appointed by the Minister of Industry and Agriculture, visited Germany in June last in order to make a thorough study of the methods employed for the synthesis of ammonia. This mission has now returned, and it is reported that an exhaustive report of their labours is about to be published.

## Price of Soda Crystals

### Liverpool Summons Adjourned

AT the Liverpool Police Court on May 6, H. Davison & Son, Ltd., of 13-21, Carpenter's Row, Liverpool, were summoned under the Profiteering Act for selling to Heaths (London), Ltd., 1 ton of soda crystals at a price of £7 10s. per ton, which was such as to yield a profit of £2 per ton, and which, in view of the circumstances, was alleged to be unreasonable. The defendants, who pleaded not guilty, were represented by Mr. J. H. Layton, barrister.

Mr. Howard Roberts, for the prosecution, said the summonses were taken out by the Board of Trade consequent upon an inquiry by the Complaints Committee of the Profiteering Committee. On May 20 of last year the defendants sold to Heaths (London), Ltd., 1 ton of soda crystals for £7 10s. The price at which Messrs. Davison had purchased that quantity from the United Alkali Co. on May 14 was £5 10s. The profit of £2 per ton was equal to 36.36 per cent. gross, and 26.66 per cent. net, which, the prosecution contended, was an unreasonable rate of profit to demand.

Mr. O. M. Edwards, sales manager for the United Alkali Co., in answer to Mr. Layton, said the manufacturers' selling price in 1914 was £2 10s. a ton, as against £5 10s. in May, 1920. He could not say what was the average pre-war profit of the wholesaler.

The Stipendiary said he had nothing to guide him as to whether the profit obtained in the transaction was reasonable or not. If, however, the prosecution thought they could call further evidence, he was prepared to grant an adjournment.

On the application of Mr. Roberts, the Stipendiary adjourned the proceedings until May 12, the costs of the first hearing to be borne by the prosecution.

### Decision in Soda Crystals Case

AT the Guildhall on Monday, before Mr. Alderman Newman, the decision was given in the case of John C. Mascarenhas, who, trading as John Lloyd & Co., chemical manufacturers, of Broad Street House, was summoned under the Profiteering Act for selling to Messrs. Salmon & Co., of Holborn, 10 tons of soda crystals at a price which, in view of all the circumstances, yielded an unreasonable profit. (*See* THE CHEMICAL AGE, April 30, page 510.)

The Alderman said he had given very careful attention to the case, and had come to the conclusion that it came under the provisions of the Act. He did not, however, think it a very serious instance, and he would, therefore, only inflict a fine of £5 and £10 10s. costs.

### Soda Crystals Case Dismissed

AT the Guildhall, London, on Monday, Morris Brothers, Ltd., chemical manufacturers, of Moorgate Station Chambers, E.C., and Alfred Norris, managing director, were summoned in respect of two tons of soda crystals which they sold to John Lloyd & Co., and which, it was alleged, yielded a profit of 75 per cent. Mr. H. D. Roome, prosecuting, said on the 4th of May the defendant firm purchased from Bostock & Co., of Ashton-under-Lyne, two tons of soda crystals for £8. Six days later they sold it to John Lloyd & Co., at £14, which gave a profit of £6 a ton.

The summonses were dismissed.

### Origin of Petroleum

LECTURING at the Institute of Petroleum Technologists on Tuesday upon "Trinidad as a field for the study of the origin of petroleum," Professor P. Carmody (late Government analyst and professor of chemistry, Trinidad) said that until the origin of petroleum was better understood through systematic investigation by experienced observers, the search for it would be accompanied by disappointment and failure. Oil finding was no longer an individual but a national problem, to which our best scientific men should be set. He knew of no more suitable place than Trinidad for carrying out an investigation, and he hoped that the proposal to pool the geological work there would be realised.

## Alleged Infringement of Dye Patent

### Plaintiffs' Appeal Dismissed

THE Court of Appeal, consisting of the Master of the Rolls and Lords Justices Warrington and Younger, on Monday dismissed an appeal by the Actiengesellschaft Für Anilin Fabrikation in Berlin and the Mersey Chemical Works from a judgment of Mr. Justice Sargant dismissing their action against Levinstein, Ltd., of Blackley, Manchester, for alleged infringement of the plaintiffs' patent, 1151, of 1900, for the manufacture of a direct black dye. Mr. Justice Sargant held that because defendants in their process used sodium dinitrophenolate instead of dinitrophenol mentioned in the plaintiffs' specification there had been no infringement.

Lord Justice Warrington, who delivered the judgment of the Court, said Mr. Justice Sargant was quite right in holding that the attack made by Levinstein, Ltd., on the validity of the plaintiffs' patent failed. The other question was whether Mr. Justice Sargant was also right in holding there had been no infringement. On that their lordships found (1) that the plaintiffs' specification was in terms confined to a process of boiling with dinitrophenol, a definite chemical combination of which the formula was given, (2) that the dinitrophenolate of sodium used by Levinstein, Ltd., in their process was a different chemical combination having physical properties distinct from those possessed by dinitrophenol, (3) that the process of boiling dinitrophenolate with the solution mentioned in the plaintiffs' specification would not be covered by the claim unless plaintiffs could show that was part of the common knowledge at the date of the patent, (4) that the plaintiffs had not established such common knowledge and therefore the defendants' process was not within the claim.

There had therefore been no infringement and the appeal would be dismissed.

### The Nitrate Market

HENRY BATH & SONS, LTD., in their monthly report on nitrate of soda, state :—

The course of the market has continued to be disappointing since our last report, and April deliveries in Europe show a falling off of nearly 20,000 tons compared with April, 1920. As the end of the nitrate year—June 30—draws near it becomes evident that European deliveries in the twelve months will not much exceed 700,000 tons—a deficit of about 500,000 tons, compared with what was originally expected.

In view of lower prices than anticipated being fixed or contemplated for beetroot, it was decided early in April to reduce pool prices in the principal continental markets by £2 to £3 per ton, but this appeared to have little or no effect in stimulating the demand, and the second hand sellers of nitrate which emanated from American shippers continued to monopolise most of the demand at a further discount. The competition of sulphate of ammonia, at prices which still compared very favourably with those for nitrate, also continued to make serious inroads on the demand for the latter article, and the use of sulphate for fertilising appears to have extended this spring to a much later date than usual.

The recent improvement in continental exchanges comes too late in the season to have any material effect this year on consumption, and it only remains to look forward to such a further development in that direction as will in time facilitate an increase in the consumption of nitrate of soda, in common with all other commodities.

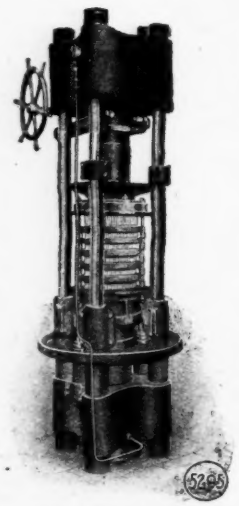
April production in Chile is cabled as about 137,000 tons, with 65 oficinas working. This compares with about 149,000 tons produced by 80 oficinas in February—the latest month when the number of working oficinas was reported. Stocks in Chile on the 1st inst. were about 1,320,000 tons, and these, together with existing stocks outside Chile show a surplus which is probably sufficient to supply the world's requirements of nitrate of soda until June, 1922, without further production.

From comparisons made between samples of Morwell (Victoria) BROWN COAL and the average of 126 samples of German brown coal it has been found that the Morwell coal contains nearly 7 per cent. more carbon than the German coal.

## British Chemical Plant

BEFORE the war many British chemical manufacturers had recourse to Germany for their requirements in chemical plant. This was largely due to the lack of co-operation which then existed between the two branches. During the last few years British chemical and chemical plant manufacturers have made great progress in this respect, aided since last July by the British Chemical Plant Manufacturers' Association.

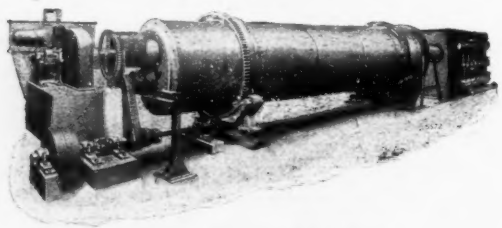
Plant which was formerly only obtainable from Germany is now manufactured and sold in this country in increasing quantities. An instance of this is afforded by the type of hydraulic press illustrated below, which was only obtainable from Germany ; this type of press has been adapted for the treatment of naphthalene and is now being manufactured by Manlove, Alliott & Co., Ltd., of Nottingham, the original manufacturers and patentees in this country of the hydro-extractor. The main feature of interest in this press is the cage, which is built up of vertical bars, having very fine spaces between them. It is constructed in such a way that the cage keeps itself clear and unclogged, while, owing to its sturdy construction, high pressures can be put on the cake.



HYDRAULIC PRESS.

The firm, which was established more than eighty years ago, commenced the manufacture of filter presses at an early date, and they now inform us that they have in hand a number of wood filter-presses which they state are the largest manufactured in this country.

They also make a large variety of drying machinery, one type of which, a rotary continuous drier, is here illustrated. This machine consists of a rotating cylinder, heated by hot air which is drawn through the machine by a suction fan after first passing through a heater. A cyclone separator is installed to catch any dust that may be formed. The material passes through the machine owing to its being set at a slight inclination, and is caught by lifting vanes and showered through the hot air current. This type is claimed to be very useful for drying crystals, but for dealing with such problems as sand for glass making, sulphate of lime, oxides, ochres, &c., fire-heated machines are constructed. Other types of driers are the Firman & Johnstone, for dealing with manures, trade wastes, blood, &c., while the vacuum Johnstone drier is used for dealing with certain foodstuffs and colours.



ROTARY CONTINUOUS DRYER.

The manufacture of vacuum evaporators to suit such purposes as the concentration of glue, caustic soda, soap lye, brine and double solutions, such as sodium tungstate and carbonate of soda, is also undertaken by the firm, and the double effect plant, with salt box, surface condenser, and wet vacuum pump, is claimed to effect a considerable reduction in evaporation losses.

Other manufactures of the firm include centrifugal mixers, sugar-crushing machinery, centrifugal subsiders, oil crushing, refining and deodorising plant and refuse destructors.

## Chemical Matters in Parliament

### Sulphate of Ammonia

Replying to Sir H. Hope (House of Commons, May 4), who asked the Minister of Agriculture what was the price fixed for farmers to pay for sulphate of ammonia, and what price was obtainable for this fertiliser for export, the Minister of Agriculture (Sir A Boscawen) said the net cash price for sulphate of ammonia delivered to the consumers' nearest railway station or wharf in Great Britain, or, in the case of sales to Ireland, the Channel Islands or the Isle of Man, free on board at British port, for delivery during the period March to May, 1921, was £24 11s. per ton, for quantities of not less than 4 tons, additional charges being authorised for quantities of less than 4 tons. The maximum selling price previously fixed by arrangement between the Ministry and the makers for deliveries during the March-May period was £27 13s. 6d. per ton, but owing to a decline in the world price of nitrogenous fertilisers the makers agreed to reduce their prices. The Ministry was informed that sulphate of ammonia was being exported on old contracts ranging from £25 to £40 a ton. Contracts for forward delivery abroad were being made at from £16 to £18 per ton, and it was anticipated that the prices for home consumption next season would be reduced to conform to the world price of nitrogenous fertilisers.

### Key Industries Bill

Mr. Clough (House of Commons, May 5) asked the Secretary to the Board of Trade whether, in view of the coming legislation, he would consider the desirability of laying before the House actual and authenticated statistics showing the effect on British trade of foreign imports which, owing to cheap labour and the low rate of exchange, could be sold at prices which defied competition ?

Mr. Baldwin said he could not undertake to lay a statistical statement, for it would not be possible to give in that form information which would take due account of many important factors. Information on the matter would, however, be submitted to the House when the Ways and Means Resolutions were moved.

In the House of Commons on Wednesday the first resolution was carried by 236 votes to 72.

### German Reparation (Recovery) Act

Lieut.-Colonel Hurst (House of Commons, May 6) asked the President of the Board of Trade whether a firm of Manchester importers which bought goods from Austria and produced a certificate of Austrian origin could safely ask for delivery of such goods from the sellers without coming under the German Reparation (Recovery) Act, even if the goods were in fact transmitted to England through German territory ?

Mr. Hilton Young said the answer was in the affirmative, provided that a Consular certificate as to Austrian origin in the prescribed form was produced, and the goods, when they left Austria, were in fact consigned from the Austrian sellers to their customers in the United Kingdom .

### The Products Corporation

In reply to further questions by Sir Frederick Hall (House of Commons, May 9) relating to the Products Corporation, Ltd., Sir P. Lloyd-Greame said the Board of Trade was making a full inquiry, but he was not yet in a position to make a statement on the subject as it would be very unfortunate to take any decision until the fullest possible inquiry had been made.

### Scientific Instruments

Mr. Lyle Samuel (House of Commons, May 9) asked whether inquiries had so far shown that if German chemical and surgical instruments were prohibited we should be as a nation chemically and surgically inefficient.

Sir P. Lloyd-Greame said this was a matter more conveniently discussed in Debate.

### Fuel Research

Mr. Clough (House of Commons, May 9) asked the President of the Board of Trade whether, in view of the fact that the present coal stoppage had shown the extreme undesirability of the nation having to depend on one type of fuel, he would in future endeavour to stimulate experimental research and development in the employment of other kinds of fuel.

Mr. Balfour, who said he had been asked to answer this question, replied that the national services and industrial

and commercial interests had given much attention in recent years to research and development in the employment of fuels other than coal. There was no lack of stimulus or encouragement for investigations bearing on the matter. The measure of success already attained had been such that an adequate supply of these fuels had become the more pressing question. The Fuel Research Board, constituted in 1917, under the Department of Scientific and Industrial Research, was prosecuting inquiries and investigations in various directions; the results of its work were published from time to time.

**German Reparation (Recovery) Act.**

Replying to Mr. Raffan (House of Commons, May 9), Sir P. Lloyd-Greame said he was not prepared to issue orders similar to the Board of Trade Order No. 6, classing goods from the Cologne area, occupied by the British, and the Coblenz area, occupied by the Americans, as of English and American origin.

In reply to a question by Mr. Hogge, who asked whether the German Reparation (Recovery) Act would be suspended or withdrawn if the 25 or 26 per cent. on German exports were continued, the Prime Minister said he could give no answer, at any rate, until he knew that the Germans had accepted the terms.

Major Jameson asked the Chancellor of the Exchequer whether, in view of the terms of the German Reparation (Recovery) Act, 1921, if a British importer found it necessary to pay the full purchase price to the German exporter in respect of any goods, a similar amount should be paid to the Customs authorities, and not only an amount equal to 50 per cent. of the invoice price of the goods.

Commander Hilton Young said the answer was in the affirmative. The levy was fixed at a percentage of the value of the goods. That value was defined by Section 3 (1) as including the sum payable to the Commissioners, and Section 3 (2) provided that the invoice would be accepted as *prima facie* evidence of the value, if it included the sum payable to the Commissioners. The value on which the prescribed percentage was payable to the Customs would therefore be the sum of the amount payable to the German exporter and the amount payable to the Customs, and while that percentage remained fixed at 50 per cent. it followed that if the whole invoice price was paid to the Germans an equal amount was payable to the Customs, being 50 per cent. of the value of the goods as defined by the Act.

Replying to a question by Captain Wedgwood Benn (House of Commons, May 11), Lieut.-Commander Hilton Young said the amount received under the German Reparation (Recovery) Act during the five weeks since April 2, was £9,000.

**Excess Profits Duty**

Mr. R. Richardson (House of Commons, May 10) asked the Chancellor of the Exchequer whether his attention had been drawn to the statement made at the annual meeting of the shareholders of Lever Brothers, Ltd., to the effect that the firm and its associated companies ought never to have come within the scope of the Excess Profits Duty, as no excess profits had been made by them; whether he was aware that the profiteering sub-committee on the soap industry reported that it was clear that a large part of the high prices paid for soap during the war went in payment of Excess Profits Duty, and that the tax was paid directly by the soap consumer and not by the soap shareholders as such; and whether, in the event of Lever Brothers making a claim for return of any duty paid, these facts would be borne in mind and the claim carefully scrutinised?

Mr. Young said his attention had been drawn to the statement and report referred to. The Commissioners of Inland Revenue were precluded by Statute from disclosing information relating to the taxation of particular taxpayers: the Commissioners carefully examined all claims to repayment of Excess Profits Duty and restricted the repayment to such sums as the taxpayer proved to be due to him under the provisions of the law.

———ooo———

ETHYLENE GLYCOL AND DICHLOROACETIC ACID are now being made in limited quantities by the Dow Chemical Co., U.S.A. These products are claimed to be of exceptional purity owing to the new process by which they are produced. This process, it is stated, does away with the necessity of using chloral as an intermediate.

# From Week to Week

The shipments of PATENT FUEL from South Wales to foreign ports were entirely suspended last week.

During 1920, 27,491 metric tons of DYES AND COLOURS were exported from the Netherlands.

IMPORTS AT SWANSEA showed an increase last month, mainly due to the arrival of 26,130 tons of oil.

SULPHUR is believed to exist in the Netherlands East Indies in quantities large enough to be of commercial value.

The thirty-two SOYA BEAN OIL manufacturers of Harbin propose to form an association for exporting their produce.

A BY-PRODUCT FACTORY has been established by the butchers of Derby where fertilizers, meat-meal, and poultry food will be manufactured from offal.

Mme. Curie embarked last week on the "Olympic" for New York, where she, representing France, will be presented with a GRAMME OF RADIUM.

The remaining Scottish SHALE AND OIL WORKS are reported to have closed down, owing to the large accumulation of stocks, and also on account of the coal shortage.

Exports of ANILINE DYES from the United States of America during February amounted to $397,123, as compared with $1,850,662, the total for February, 1920.

In the Glasgow High Court on Tuesday, Andrew Livingstone, accused of FIRE-RAISING at Auldfield Dyeworks, Pollokshaws, where he was employed, was found not guilty.

Mr. STAINER HUTCHINS, of Davenham, Cheshire, has joined the Board of Directors of the Lawes' Chemical Manure Co., Ltd., of London, Glasgow and Shrewsbury.

It is reported that the QUEBRACHO EXTRACT FACTORY of the Forestal Land Company at Villa Guillermina has closed down owing to the present state of stagnation in trade.

The Anglo-Persian Oil Co. state that they have no knowledge that the Prince of Wales intends, when he visits South Wales, to open Oilville, Skewen, their NEW REFINERY near Swansea.

A Bill has been introduced in the Chilean Senate providing for the establishment under Government control of an ASSOCIATION OF NITRATE COMPANIES, which would trade in nitrate on its own account.

THE LATE MR. WILLIAM JAMES CHRYSTAL, Auchendennan, head of the firm of J. & J. White, chemical manufacturers, who died on April 21, bequeathed £75,000, free of duty, to various Glasgow institutions and charities.

Professor Albert Calmette, Dr. Henri Deslandres, Professor Albert Einstein, Professor Albin Haller, Professor Edmund B. Wilson and Professor Peter Zeeman have been elected FOREIGN MEMBERS of the Royal Society.

The Comptoir Franco-Oriental du Naphte has been formed as a sister company to the Lille-Bonnieres-Colombes and the Baku Oil Co. for the purpose of purchasing and selling the PRODUCTS OF NAPHTHA in the river districts of the Black Sea.

The COUNCIL OF THE UNIVERSITY COLLEGE OF SWANSEA has decided to institute Advisory Committees in ferrous metallurgy, non-ferrous metallurgy, and engineering, containing representatives of the College and the industries concerned.

The death is announced, at the age of 54, of Mr. BERNARD BLOUNT, analyst and consulting chemist and author of a "Practical Electro-Chemistry." He was also part author of "Chemistry for Engineers and Manufacturers," and of a monograph on "Cement."

In connexion with the conference on the means of increasing the THERMAL EFFICIENCY OF HEAT-POWER PLANTS, which is to be held by the Institution of Mechanical Engineers in London on June 30 and July 1, there will be an exhibition of all kinds of appliances connected with boiler-room economy and the efficient use of steam.

Compared with the figures for March, there was a reduction of about 17,000 tons in the quantity of PATENT FUEL exported from the South Wales ports during April, the total shipments amounting to 10,548 tons, against 27,362 in the previous month, 48,802 in February and 75,381 in January. The exports from Swansea, the main seat of the industry, last month amounted to 3,500 tons, as against 86,599 in April last year.

# References to Current Literature

## British

SULPHUR COMPOUNDS. The formation and properties of dithioketones and dithio-ethers. Part I. K. G. Naik. *Chem. Soc. Trans.*, April, 1921, pp. 379-385.

The interaction of sulphur monochloride and substituted ethylenes. W. J. Pope and J. L. B. Smith. *Chem. Soc.* Trans., April, 1921, pp. 396-400.

$\beta\beta^1$—Dichlorodiethyl disulphide. G. M. Bennett. *Chem. Soc. Trans.*, April, 1921, pp. 418-425.

REDUCTION. Quantitative reduction by hydriodic acid of halogenated malonyl derivatives. Part I. The amides of *s*-di-alkyl- and aryl-substituted amides of mono- and di-bromomalonic acid. J. V. Backes, R. W. West and M. A. Whiteley. *Chem. Soc. Trans.*, April, 1921, pp. 359-379.

AMMINES. Complex metallic ammines. Part V. *cis*-Succinatodiethylenediaminecobaltic salts, and other cobaltammine salts containing a seven-membered ring in the complex. J. C. Duff. *Chem. Soc. Trans.*, April, 1921, pp. 385-390.

HYDRAZONES. The stability of tantomeric formaldehyde-phenylhydrazones. N. V. Sidgwick and E. K. Ewbank. *Chem. Soc. Trans.*, April, 1921, pp. 486-492.

WATER. The colour and molecular formula of water and ice. E. Tomkinson. *Chem. News*, May 6, 1921, pp. 205-208.

GENERAL. The present position of chemistry and chemists. Part I. N. T. M. Wilsmore. *Chem. News*, May 6, 1921, pp. 208-211.

FERTILISERS. The utilisation of basic slag. E. J. Russell. *Trans. Faraday Soc.*, February, 1921, pp. 263-268.

The physical chemistry of basic slags. C. H. Desch. *Trans. Faraday Soc.*, February, 1921, pp. 272-274.

Solubility of basic slags. F. Bainbridge, J. E. Stead and E. W. Jackson. *Trans. Faraday Soc.*, February, 1921, pp. 302-309.

ELECTRO-CHEMISTRY. Conduction of electricity through fused sodium hydrate. A. Fleck and T. Wallace. *Trans. Faraday Soc.*, February, 1921, pp. 346-359.

The theory of electrochemical chlorate and perchlorate formation. Bibliography. N. V. S. Knibbs and H. Palfreeman. *Trans. Faraday Soc.*, February, 1921, 402-433.

The electrolysis of solutions of sodium nitrite using a copper anode. F. H. Jeffery. *Trans. Faraday Soc.*, February, 1921, pp. 453-457.

## British Dominions

LIME. Hydrated lime, a chemical engineering product. L. E. Allan. *Canad. Chem. and Met.*, April, 1921, pp. 99-101.

OILS. Vegetable oils, with special regard to the manufacture of food products from edible vegetable oils. H. Tefft. *Canad. Chem. and Met.*, April, 1921, pp. 102-104.

PIGMENTS. A classification of pigments, with a descriptive outline of the manufacture of some dry colours. G. C. McEwen. *Canad. Chem. and Met.*, April, 1921, pp. 108-110.

PAPER. The chemical engineer and the sulphite division of the newsprint industry. R. W. McKenzie. *Canad. Chem. and Met.*, Part I., March, 1921, pp. 75-76; Part II., April, 1921, pp. 105-107.

## United States

ALUMINIUM COMPOUNDS. Residual aluminium compounds in water filter effluents. A. Wolman and F. Hannan. *Chem. and Met. Eng.*, April 27, 1921, pp. 728-734.

MERCAPTANS. The catalytic preparation of mercaptans. R. L. Kramer and E. E. Reid. *J. Amer. Chem. Soc.*, April, 1921, pp. 880-890.

ESTERS. The preparation of esters by direct replacement of alkoxyl groups. M. Reimer and H. R. Downes. *J. Amer. Chem. Soc.*, April, 1921, pp. 945-951.

The application of Victor Meyer's esterification law to 2 : 6-xylic acid and its reduced derivatives. R. W. Hufferd and W. A. Noyes. *J. Amer. Chem. Soc.*, April, 1921, pp. 925-935.

VALENCY. The nature of secondary valency. Part II. Partition coefficients. H. W. Smith. *J. Phys. Chem.*, March, 1921, pp. 204-263.

ANTIMONY. A revision of the atomic weight of antimony. The analysis of antimony bromide. H. H. Willard and R. K. McAlpine. *J. Amer. Chem. Soc.*, April, 1921, pp. 797-818.

STEELS. Microstructure of chromium steels. Review of the literature. *Chem. and Met. Eng.*, April 20, 1921, pp. 703-706.

Structure of tungsten steels. Review of Honda and Murakami's work. *Chem. and Met. Eng.*, April 27, 1921, pp. 745-748.

DYES. The pyrazolone dyestuffs. J. A. Wilson. *Textile col.*, April, 1921, pp. 242-243.

The bearing of a synthetic dye industry upon our national welfare. M. T. Bogert. *J. Franklin Inst.*, April, 1921, pp. 445-472.

TANNING. Iron tannage. Part III. D. D. Jackson and T. P. How. *J. Amer. Leather Chem. Assoc.*, April, 1921, pp. 202-219.

## French

HYDROGENATION. The hydrogenation of quinhydrones. E. Bülmann. *Ann. Chim.*, March-April, 1921, pp. 109-157.

ACROLEIN. Some physico-chemical constants of acrolein. C. Moureu. *J. Chim. Phys.*, December 31, 1920, pp. 333-347.

ACRYLIC ACID. Some physico-chemical constants of acrylic acid. C. Moureu and A. Boutaric. *J. Chim. Phys.*, December 31, 1920, pp. 348-352.

IONISATION. The ionisation of gases during chemical reactions. A. Pinkus and M. de Schulthess. *J. Chim. Phys.*, December 31, 1920, pp. 366-411.

OZONE. The applications of ozone to the varnish and fatty acid industries. L. Pierron. *Rev. Chim. Ind.*, April, 1921, pp. 109-112.

PIGMENTS. Titanium white. C. Coffignier. *Rev. Chim. Ind.*, April, 1921, pp. 101-105.

The manufacture of ultramarine blue. Part II. M. Sauvageot. *Rev. des Prod. Chim.*, April 15, 1921, pp. 205-212.

RUBBER. The colloidal state and its relation to rubber. H. Pott. *Le Caoutchouc*, April 15, 1921, pp. 10.853-10.861.

PHYSICAL CHEMISTRY. The phase rule; its application to the double decomposition of salts; geometrical representation. H. Le Chatelier. *Rev. Met.*, March, 1921, pp. 147-156.

COMBUSTION GASES. Theoretical considerations on the subject of combustion gases, and the gasification of carbon. J. Seigle. *Rev. Met.*, February, 1921, pp. 81-91.

HYDROGEN. The manufacture of hydrogen for the synthesis of ammonia. G. Claude. *Compt. rend.*, April 18, 1921, pp. 974-977.

CATALYSIS. Catalytic hydrogenation by means of copper. P. Sabatier and B. Kubota. *Compt. rend.*, March 21, 1921, pp. 733-736.

AMINES. Preparation of amines of secondary alcohols. A. Mailhe. *Compt. rend.*, March 14, 1921, pp. 692-694.

SULPHONIC ACIDS. The migrations of the sulphonic group in aromatic molecules. J. Martinet. *Rev. gen. des Matières Colorantes*, April 1, 1921, pp. 49-51.

## German

TANNIN. The extraction of tannin. E. Knape. *Chem.-Zeit.*, March 10, 1921, pp. 239-241.

SODIUM SULPHATE. The manufacture of Glauber's salt. W. Hüttner. *Chem.-Zeit.*, March 31, 1921, pp. 313-315.

TARTARIC ACID. The manufacture of potassium bitartrate and tartaric acid. H. Voss. *Chem.-Zeit.*, Part I., March 31, 1921, pp. 309-313; Part II., April 7, 1921, pp. 335-337; Part III., April 14, 1921, pp. 360-364.

CHEMICAL METHODS. New high-vacuum methods in chemistry. M. Volmer. *Z. angew. Chem.*, April 15, 1921, pp. 149-151.

CATALYSIS. Adsorption catalysis. M. Polanyi. *Z. Elektrochem.*, April 1, 1921, pp. 142-150.

# Patent Literature

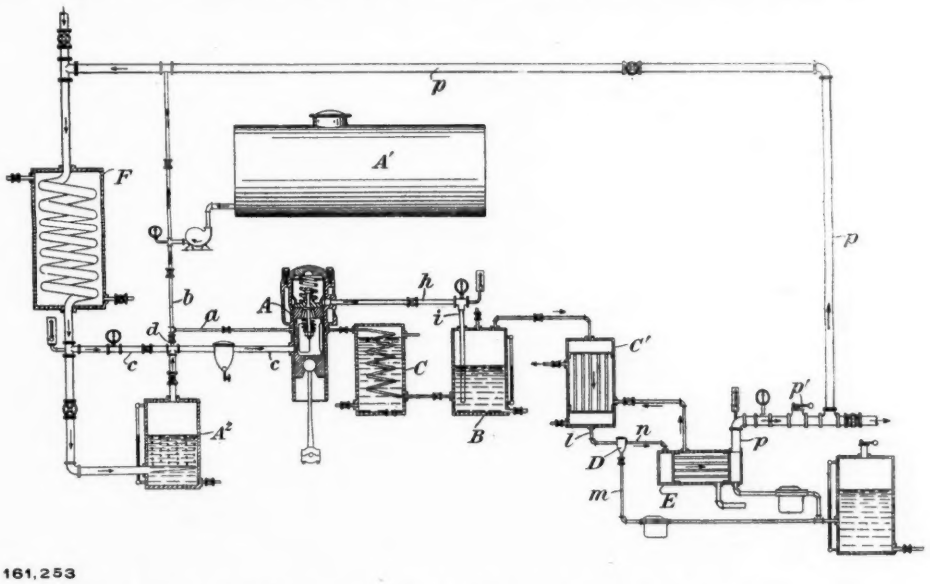
## Abstracts of Complete Specifications

161,244. AMMONIA, METHOD AND MEANS FOR USE IN THE MANUFACTURE OF. R. P. Douglas, 12, Nelson Square, Bolton, Lancs. Application date, December 31, 1919.

The process is for manufacturing concentrated solutions of ammonia in small quantities, and is worked in conjunction with the process for the manufacture of sulphate of ammonia. The vapour arising from the liming chamber of the still which contains crude ammoniacal liquor, consists of steam and pure ammonia. This vapour is drawn off and passed into the lower end of a reflux condenser where most of the steam is condensed. The ammonia passes out at the top, and is condensed as a concentrated solution in an ordinary condenser. This concentrated solution is free from sulphuretted hydrogen, and may be used for neutralising the free acid in sulphate of ammonia.

161,253. PETROLEUM AND ANALOGOUS DISTILLATES, PROCESS OF CLEANING AND REFINING. A. J. Paris, Hotel Ruffner, Charleston, W.Va., U.S.A. Application date, January 2, 1920.

The process is for treating petroleum distillates, more particularly those ranging from the lighter petrols to illuminating oils, and consists in treating the distillate, suspended as mist in a permanent gas, with a neutral purifying agent such as glycerine, turkey-red oil, mineral lubricating oil or castor oil. The permanent gas may be hydrogen, nitrogen, coal gas, or natural gas. The oil distillate passes from the cylinder, $A^1$, through pipes, $b$, $a$ to a compression cylinder, $A$, to which gas is also supplied by the pipe, $c$, and the gas is compressed to 25-350 lbs. per square inch, and mixed with the oil mist. Alternatively, the gas may be passed through the crude oil in a vessel, $A^2$, or may be mixed with an oil spray. The purifying agent passes from the tank, $B$, through a pipe, $g$, and temperature regulator, $C$, to the cylinder, $A$. The mixture is delivered through a pipe, $h$, $i$ to the vessel, $B$, where the purifying agent is trapped for re-use, and the gas passes on through a pipe, $j$, to a condenser, $C^1$, where the bulk of the oil vapour is condensed. The condensate and gas pass through a pipe, $l$, and trap, $D$, from which the condensed oil is drawn by pipe, $m$, to a tank. The gas passes through a pipe, $n$, to a condenser, $E$, at a lower temperature than the condenser, $C^1$, where the residual vapour is condensed. The gas passes on

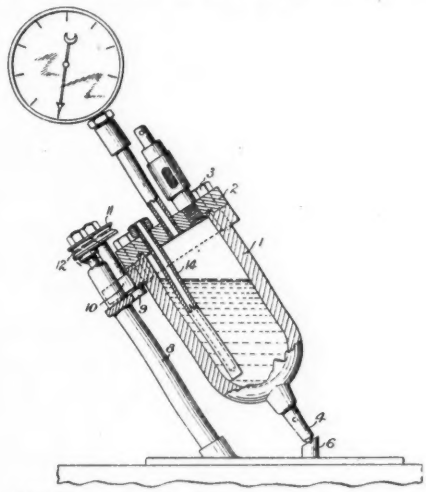


161,253

through the pipe, $p$, and pressure reducing valve, $p^1$, back to a heat regulator, $F$, and to the pipe, $c$, for re-use. Glycerine or turkey red oil are found to remove tarry vapour, sulphur compounds and water vapour from the oil, but castor oil and mineral lubricating oil are not hygroscopic and do not remove water vapour. The gas and distillate in the compressor, $A$, may be at 150°F. before compression, and the glycerine, &c., may be injected at 60°F., but in any case the temperatures must be so controlled that cracking of the distillate does not take place.

161,269. PRESSURE DIGESTERS OR AUTOCLAVES. H. Edenborough, 35, Oakley Crescent, Chelsea, London, S.W.3. Application date, January 5, 1920.

The object is to provide a stirring device for a pressure digester or autoclave, which avoids the usual leakage through the stuffing box or gland under very high pressures. The autoclave, 1, is provided with a cover, 2, secured by bolts, 3,



161,269

and has a pivot, 4, at the bottom engaging in a bearing, 6. A pillar, 8, is inclined at an angle of about 30° to the vertical, and carries an arc shaped bar, 9, having a friction roller, 10, at each end, against which the flange of the autoclave rests, so that it is supported at the same angle. The rollers, 10, are secured to pulleys, 11, which are interconnected by a belt which also passes round an intermediate pulley, 12. The autoclave may thus be rotated by operating either of the pulleys, 11. A stirrer, 14, is mounted eccentrically in the

cover, 2, so that as the autoclave is rotated the liquid level within remains horizontal, but changes its position in regard to the member 14, and is thus subjected to a stirring action.

161,273. ACID SODIUM PYROPHOSPHATE, MANUFACTURE OF. A. Kelly, 57, Chancery Lane, London, W.C.2. Application date, January 5, 1920.

A strong solution of sodium pyrophosphate ($Na_4P_2O_7$) is mixed with the requisite amount of hydrochloric acid to convert the whole of the normal salt into acid sodium pyrophosphate. The solution is then saturated with salt, and allowed to stand when the acid sodium pyrophosphate separates out and is filtered.

161,280. PIGMENTS, PROCESS OF MAKING. R. Baker, 3632, Connecticut Street, St. Louis, Mo., U.S.A. Application date, January 6, 1920.

A sun-proof zinc white pigment is made by the reaction of zinc sulphate and barium sulphide solutions. A solution of zinc sulphate is subjected to the action of steam and oxygen or air, and an alkaline earth peroxide such as barium or calcium peroxide, and zinc monoxide or lead monoxide are added to the extent of about 1 per cent. by weight of the zinc sulphate. The iron impurities in the solution are thus precipitated and are removed by filter pressing. The solution is then again subjected to the action of steam and compressed air, and again filter pressed. The solution is then treated with the equivalent amount of barium sulphide solution whereby a mutual precipitation of zinc sulphide and barium sulphate takes place. This precipitate is filtered out, washed, dried, calcined, quenched, ground wet and again washed, filter-pressed and dried.

161,310. ALUMINA AND ITS SALTS FROM CLAY, PROCESS FOR THE EXTRACTION OF. H. G. Wildman, 249, Melville Avenue, Westmount, Quebec, Canada. Application date, January 14, 1920.

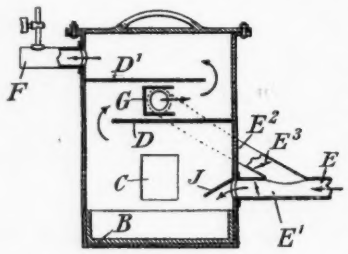
China clay is boiled with an alkaline solution prepared by boiling soda ash with an insufficient quantity of lime to convert all the carbonate into hydrate. Part of the alkali combines with the clay, and the remainder is then drawn off and the deficiency of sodium carbonate and hydrate made up so that it can be used for treating a further quantity of clay. The clay is placed in a digester and agitated with sulphur dioxide which produces aluminium sulphite which is soluble in cold water containing sulphur dioxide. The liquor is then filtered to remove precipitated silica and transferred to a second digester provided with steam-heating coils and a vacuum pump. The sulphur dioxide is liberated, and is removed by the pump for use again. The aluminium sulphite which is now insoluble is precipitated, and is recovered as filtered cake. This material is ignited to recover the sulphur dioxide for use again, leaving aluminium oxide for electric reduction to the metal. The sodium sulphite obtained as a by-product may be converted into sodium hyposulphite or may be boiled with the milk of lime to precipitate calcium sulphite from which sulphur dioxide may be obtained by ignition. Silica in a very fine state of division and white in colour is obtained as a by-product.

161,375. CALCINED ORE AND THE LIKE, PRE-LEACHING APPARATUS FOR USE IN THE TREATMENT OF. E. C. Vigeon, and J. McConway, Bede Works, Hebburn-on-Tyne, Durham. Application date, February 6, 1920.

Hot calcined ore from a furnace is fed on to one end of a helical conveyor arranged in a trough. At one point in its travel the ore is sprinkled with water, and is then further mixed by the conveyor to produce a moist homogeneous material. The subsequent leaching process is thereby facilitated.

161,439. OXYGEN COMPOUNDS OF SULPHUR, APPARATUS FOR THE MANUFACTURE OF. T. A. Clayton, 5, Rue Henri de Bornier, Paris. Application date, April 9, 1920. Addition to 141,661. (*See* THE CHEMICAL AGE, Vol. II., p. 699).

Sulphur is charged through the door, *C*, on to a hearth, *B*, where it is burnt. Air is supplied by the pipe, *E*, having two branches, $E^1$, $E^2$, controlled by dampers, $E^3$, the lower branch of which is provided with a deflector, *J*, to direct the air downwards on to the sulphur. The upper branch opens into the burning chamber at the side between crescent-shaped baffle plates, *D*, $D^1$, and the outlet is enclosed by a baffle *G*, which directs the secondary air towards the outlet, *F*, so that back flow of gas towards the hearth is prevented, and a gaseous mixture having a maximum concentration of $SO_2$ and $SO_3$ is obtained. Other arrangements of primary and secondary air supply pipes and their baffles are also described.



161,439

NOTE.—The following specifications which are now accepted were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 136,543 (W. A. Patrick) relating to silica gels, *see* Vol. II., p. 210; 139,168 (Koppers Co.) relating to purifying liquors containing phenoloid bodies, *see* Vol. II., p. 479; 143,212 (H. Terrisse and M. Levy) relating to obtaining glucose from wood, *see* Vol. III., p. 137; 146,214 (O. Rohm) relating to a solid non-hygroscopic iron salt, *see* Vol. III., p. 321; 147,101 (Farbwerke vorm. Meister Lucius & Brüning) relating to pyridine bases, *see* Vol. III., p. 404; 148,339 (L. Cassella & Co., Ges.) relating to a colour of the anthraquinone series, *see* Vol. III., p. 486.

### International Specifications not yet Accepted

159,461. SYNTHETIC RESINS. Bakelite Ges., 32, Lutzowstrasse, Berlin, and R. Hessen, Erkner, Berlin. International Convention date, March 1, 1920.

Phenol or cresol and formaldehyde or its polymers are condensed with a basic condensing agent, and an acid such as hydrochloric, sulphuric, oxalic, citric, or an acid substance such as sulphur dioxide is then added to an amount sufficient or less than sufficient to neutralise the base. The resin thus formed can be converted into an insoluble infusible condensation product by further treatment. If a larger proportion of acid is used, the resin is non-hardening.

159,494. SYNTHETIC RESINS. K. Kulas, 87, Weststrasse, Leipzig, Germany, and K. Pauling, 24, Luppenstrasse, Leipzig, Germany. International Convention date, February 23, 1920.

Phenol or cresol and formaldehyde are boiled with hydrochloric acid to form a resin, and a further quantity of phenol or cresol and formaldehyde added together with ammonia, caustic soda, and caustic potash, and the mixture again boiled. In another example, acetic acid is used as the condensing agent and a further quantity of phenol or cresol, formaldehyde, soap, and a hydrosulphite or sulphite is added. Fusible and soluble resins are thus obtained. If an excess of formaldehyde is used in the first example the resin becomes insoluble and infusible on further heating.

159,508. SILICA AND LIKE GELS. W. A. Patrick, John Hopkins University, Baltimore, Md., U.S.A. International Convention date, February 28, 1920.

Sodium silicate, aluminate, stannate, titanate, tungstate, or zirconate is treated with ferric, aluminium or copper chloride, with or without hydrochloric acid, to produce gels similar to those described in 136,543 (*see* THE CHEMICAL AGE, Vol. II., p. 210). The products may be used as gas absorbents or catalysts, and that obtained from sodium silicate and ferric chloride may be used as a catalyst in the production of sulphur trioxide.

159,815. EVAPORATING LIQUIDS. Soc. Generale d'Evaporation Procédés Prache et Bouillon, 106, Boulevard Haussmann, Paris. International Convention date, March 5, 1920.

The formation of crystals on the surface of liquids which are being evaporated is avoided by circulating the liquid containing crystals in suspension. The evaporation is effected in a vertical cylinder having an external conduit connecting the bottom of the cylinder with the top at the liquid level. The liquid is circulated upwards through this conduit. in which a tubular heater is interposed.

159,817. AMMONIUM CHLORIDE. O. L. Christenson, 36b, Karlbergsvagen, Stockholm, and B. A. Hedman, 59, Ostermalmsgaten, Stockholm. International Convention date, March 3, 1920.

A pulp of finely ground salt and silica is added to coal in a coke oven, so that the nitrogen is converted into ammonium chloride. The ammonium chloride is condensed in a dry state from the distillation gases by cooling them to a point at which water vapour does not condense, or all the products may be condensed together and the liquor crystallised. The crude ammonium chloride contains a small proportion of phenols and may be used as a fertiliser.

159,837. CHLORTOLUENES. Soc. Anon. des Matieres Colorantes et Produits Chimiques de St. Denis, and A. R. Wahl, 105, Rue Lafayette, Paris. International Convention date, March 6, 1920.

A mixture of *o*-chlortoluene and *p*-chlortoluene is sulphonated to a point at which some *o*-chlortoluene remains unattached. The unattached oil is removed, and the resulting *o*-chlortoluene sulphonic acid is hydrolysed. The mixture of chlortoluenes may thus be separated. If the *p*-chlortoluene is required, the mixture is sulphonated till all the *o*-chlortoluene and some *p*-chlortoluene are sulphonated, and the remainder of the *p*-chlortoluene is then separated.

159,842. METHYL ALCOHOL. I. Svarvasy, 4, Gellért tér, Buda Pest. International Convention date, July 16, 1914.

Methyl alcohol is produced by heating methyl chloride with lime and water in an iron vessel. To prevent the corrosion of the vessel by the hydrochloric acid produced, the surface is continuously washed with the alkaline liquid by rotating the vessel or agitating the liquid.

159,853-4. FERTILISERS. Soc. d'Etudes Chimiques pour l'Industrie, 8, Quai du Cheval Blanc, Geneva. International Convention date, March 2, 1920.

159,853. Addition to 151,597 (See THE CHEMICAL AGE, Vol. III., p. 690). Tricalcium phosphate is treated with sulphuric acid and the resulting mixture of phosphoric acid and sulphuric acid is used for obtaining a solution of cyanamide. Powdered calcium cyanamide is added to this solution, and the granlar product is dried. It contains nitrogen and soluble phosphate.

159,854. Powdered calcium cyanamide is added to a sulphuric acid solution of free cyanamide and the product dried.

159,866. CYANAMIDE. Wargons Aktiebolag, and J. H. Lidholm, Wargon, Sweden. International Convention date, March 3, 1920.

Calcium cyanamide is gradually added to water to which carbon dioxide is also supplied. The proportions are regulated so that the alkalinity is below 0·5 normal, and the temperature is kept above 30°C. The resulting solution contains little dicyandiamide.

159,869. HYDROCHLORIC ACID. E. Niccoli, 8, Rione Sirigano, Naples, Italy. International Convention date, March 2, 1920.

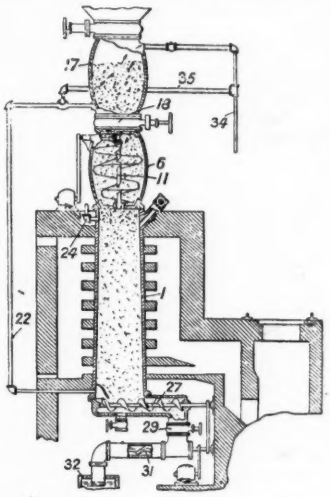
Hydrogen and chlorine are supplied to a combustion chamber by pipes which open immediately opposite to one another. The hydrogen which is at a pressure of 5-20 mm. of water is first lit by an auxiliary Bunsen burner in presence of an air supply which is subsequently cut off. The burner nozzles within the chamber are constructed of quartz, and also the discharge conduit for the hydrochloric acid gas.

159,878. CATALYSTS FOR SYNTHETIC AMMONIA. Norsk Hydro-Elektrisk Kvaelstofaktieselskab, 7, Solligaten, Christiania. International Convention date, March 9, 1920.

Iron and potassium cyanide, or chromium, cobalt or manganese mixed with alkali cyanide or alkaline earth cyanide is used as a catalyst in the synthetic production of ammonia. A pressure of 80 atmospheres and temperature of 375°C. are suitable for the reaction.

159,886. GAS MANUFACTURE. J. U. McDonald, 416, Main Street, Decatur, Ill., U.S.A. International Convention date, March 10, 1920.

Coal, peat or wood is fed from a hopper 17 through a valve 18 to a chamber 6 containing a screw conveyor 11. The material is then fed downwards into a vertical retort 1 heated by a furnace. Steam and vapour from the material pass downwards through the material to the pipe 22 and thence into the hopper 17 to preheat the charge. Additional steam may be added through the pipe 24, and the gas is finally drawn off through the pipe 34. The solid residue is withdrawn by conveyors 27, 31.



156886.

159,895. SODIUM BICARBONATE. Nitrogen Corporation, 55, Canal Street, Providence, R.I., U.S.A. (Assignees of E. E. Arnold, St. Clair, Providence, R.I., U.S.A.). International Convention date, March 11, 1920.

Sodium bicarbonate is produced by the ammonia soda process, in which ammonia and carbon dioxide are employed at 100 atmospheres pressure or in liquid form. The gases are cooled by passing through expansion valves, and the energy of the reaction is diminished by adding about 40-45 per cent. of nitrogen to the carbon dioxide. The cooled gas is used to reduce the temperature in the absorbing and carbonating towers, ammonia being preferably used so that in the event of leakage the reaction in the absorber is not affected. The nitrogen is collected for use again.

LATEST NOTIFICATIONS.

162,644. Arrangement of the explosion chambers in gas turbines. Holzwarth, H. April 29, 1920.

162,288. Means for heating the filaments of thermionic devices. Ges. Fur. Drahtlose Telegraphie. April 27, 1920.

162,655. Process for producing boron. Constant, G., and Raisin, U. April 30, 1920.

162,618. Process of desulphurising large masses of iron and steel. Koppers, H. April 28, 1920.

162,657. Manufacture of plastic material from casein. Krause, E., and Blucher, H. May 3, 1920.

## Specifications Accepted, with Date of Application

137,284. Separating and recovering gases, Method and apparatus for. W. A. Patrick, B. F. Lovelace, and E. B. Miller. December 28, 1918.

139,156. Decolorising carbon, Method of making. C. S. Hudson. February 15, 1919.

141,028. Oils and fats, Process of refining. K. Stiansen. March 21, 1919.

149,684. Acid gas or similar substance mains, Pipe connections for. P. L. Pfannenschmidt. July 31, 1919.

161,993. Filters. J. Miller and Fletcher & Co. May 5, 1919.

162,000. Stills. A. Phillip. September 15, 1919.

162,026. Argentiferous lead—zinc sulphide ores, Treatment of F. E. Elmore. December 18, 1919.

162,030. Purification of zinc solutions. S. Field and Metals Extraction Corporation, Ltd. December 19, 1919.

162,038. Powdered metals and sub-oxides, Production of. C. Ellis, January 14, 1920.

162,117. Decolourising charcoal, Process for the preparation of. De Bruyn, Ltd., and C. Revis. February 6, 1920.

162,136. Carbonaceous material, Apparatus for distilling. W. P. Perry. February 25, 1920.

162,166. Apparatus for bringing liquids and gases into intimate contact. W. C. Holmes & Co., Ltd., D. M. Henshaw and J. Whittell. April 1, 1920.

## Applications for Patents

Aluminium-Industrie Akt.-Ges. Process for manufacture of nitrate of calcium. 12,901. May 5. (Switzerland, May 19, 1920.)

Beldimano, A. Evaporating or heating liquids. 13,082. May 7.

Bismarckhütte. Separating water from coal tar. 12,974. May 6. (Germany, May 6, 1920.)

Blagden, J. W., Howards & Sons, Ltd. and Nierenstein, M. Manufacture of amino-derivatives of hydrogenated cinchona alkaloids and their derivatives. 13,004. May 6.

# Monthly Market Report and Current Prices

*Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

## British Market Report

THURSDAY, MAY 12.

A very small volume of business is reported for the past week, and whilst a few prices have hardened, no general improvement in the market is to be expected whilst labour troubles are so prominently before us.

Export inquiry has been better, but little business has materialised so far.

### General Chemicals

ACETONE.—Stocks are practically cleared, and the market is much firmer.

ACID ACETIC is higher in price, but orders are of the hand-to-mouth variety.

ACID CITRIC.—There has been more inquiry, and an improvement is not unlikely.

ACID FORMIC is slow of sale. Price nominally unchanged.

ACID OXALIC is a little easier on second-hand Continental offering.

ACID TARTARIC has been very quiet, but the price is maintained.

BLEACHING POWDER has been sold very cheaply by second-hands. The demand is nominal.

COPPER SULPHATE.—Unchanged.

FORMALDEHYDE.—Small sales have been made at a rather lower price, but the parcel in question has been exhausted, and the price has recovered.

LEAD ACETATE is quite uninteresting.

POTASH BICHROMATE.—Demand purely nominal.

POTASH CAUSTIC.—There have been a few small orders of the single drum variety, but no weight of business is doing. The price is easy.

POTASH PRUSSIATE is much firmer, and a fair business has been transacted.

SODA ACETATE is expected to improve in sympathy with acetic acid, but the demand remains quiet.

SODA BICHROMATE is still controlled by second-hand selling, and the tendency favours buyers.

SODA CAUSTIC.—The demand remains dead, and there still appear to be considerable stocks in second-hands.

SODA HYPOSULPHITE has been in fair inquiry. Price unchanged.

SODA NITRITE.—A moderate business is reported, and stocks are firmly held.

SODA PRUSSIATE has advanced in price, and if the export demand continues, a further improvement may be expected.

### Coal Tar Intermediates

Business has been slightly better this week, although the coal stoppage naturally to a large extent impedes business. Stocks, however, in many cases are very light.

ALPHA NAPHTHOL is only in moderate request, but the price is firm.

ALPHANAPHTHYLAMINE is considerably more active, and the value is well maintained.

ANILINE OIL AND SALT has been in somewhat better request on export account at current prices.

BETA NAPHTHOL is rarely asked for, but makers hold to their price.

DIMETHYLANILINE is in better request, but there is no change in value.

DIPHENYLAMINE is in better inquiry.

NITROBENZOLE is steady, and the price is firm.

PARANITRANILINE remains a quiet spot, and the value is unchanged.

PARAPHENYLENEDIAMINE has been in better request, and the price is well maintained.

PARATOLUIDINE has been asked for and supplies are very light.

PHTHALIC ANHYDRIDE is idle, and the price continues to favour buyers.

RESORCINE is only occasionally asked for, and the price is still easier.

SALICYLIC ACID is firmer, but little business is reported.

### Coal Tar Products

The market for coal tar products continues to be inactive. Prices, however, are showing a tendency to stiffen owing to the diminution of stocks consequent on the continued coal strike. A large number of the tar distillers' works have shut down owing to shortage of fuel.

90's BENZOL is selling at 2s. 10d. in the North, and 3s. in the South.

PURE BENZOL can be bought at 3s. in the North and 3s. 2d. in the South.

CREOSOTE OIL is slightly stronger and is worth 7½d. to 8d. per gallon in the North, and 8½d. to 9d. in the South.

CRESYLIC ACID remains inactive, although the price is somewhat firmer owing to shortage of fuel.

SOLVENT NAPHTHA is somewhat scarce, and is worth 2s. on rails.

HEAVY NAPHTHA is worth 2s. 3d. on rails.

NAPHTHALENE is inactive, the price for crude remaining from £8 to £12, and that for refined from £18 to £23.

PITCH.—There are no new features to report, and as the end of the season is now in view, the demand is falling off.

Prices remain unchanged at approximately 60s. to 65s. f.o.b. East Coast port, 65s. to 70s. f.o.b., London.

### Sulphate of Ammonia

There is nothing new to report.

## French Market Report

Business remains extremely quiet and the market has developed fresh weakness. Prices are in many cases only nominal, and the following are to-day's approximate values :—

ACETONE.—530 francs.
ACID ACETIC.—80 per cent., 390 francs.
ACID BORACIC CRYSTALS.—375 francs.
ACID CITRIC.—14 francs per kilo.
ACID LACTIC.—280 francs.
ACID OXALIC.—525 francs.
AMMONIUM CARBONATE.—220 francs.
AMMONIUM PHOSPHATE.—510 francs.
BARIUM CHLORIDE.—90 francs.
BLEACHING POWDER.—75 francs.
COPPER SULPHATE.—160 francs.
HYDROGEN PEROXIDE.—12 vols., 130 francs.
LEAD ACETATE.—260 francs.
LEAD NITRATE.—340 francs.
POTASSIUM BICHROMATE.—480 francs.
POTASSIUM CYANIDE.—16 francs per kilo.
POTASSIUM METABISULPHITE.—600 francs.
POTASSIUM PERMANGANATE.—10 francs per kilo.
SODIUM BISULPHITE.—50 francs.
SODIUM CAUSTIC.—120 francs.
SODIUM HYPOSULPHITE.—80 francs.
SODIUM NITRITE.—340 francs.
SODIUM PHOSPHATE.—140 francs.
ZINC SULPHATE.—80 francs.

All the above prices are for 100 kilos unless otherwise stated.

## German Market Report

Business continues very slow and prices in general are weaker. The export demand shows a heavy falling off in the volume of business transacted.

ALUM is firm at 2 marks 50 per kilo.
AMMONIUM CARBONATE is lower at 5 marks.
ACID ACETIC is weak at 10 marks.

ACID ACETIC GLACIAL.—13 marks per kilo.
ACID OXALIC.—30 marks.
ALUMINA SULPHATE.—14/15 per cent., 2 marks 50 per kilo.
COPPER SULPHATE is weak at 7 marks per kilo.
FORMALDEHYDE.—40 per cent., 25 marks.
HYDROGEN PEROXIDE.—30 per cent. in nominal demand at 30 marks.
IRON SULPHATE.—63 marks per 100 kilos.
POTASSIUM BROMIDE.—19 marks per kilo.
POTASSIUM PERMANGANATE.—26 marks per kilo.
SODIUM SULPHIDE is weak at 5 marks for the Concentrated quality.
SODIUM BROMIDE.—18 marks.

## Current Prices

### Chemicals

| | per | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Acetic anhydride | lb. | 0 | 2 | 3 | to | 0 | 2 | 6 |
| Acetone oil | ton | 105 | 0 | 0 | to | 110 | 0 | 0 |
| Acetone, pure | ton | 95 | 0 | 0 | to | 100 | 0 | 0 |
| Acid, Acetic, glacial, 99-100% | ton | 70 | 0 | 0 | to | 72 | 0 | 0 |
| Acetic, 80% pure | ton | 53 | 0 | 0 | to | 54 | 0 | 0 |
| Arsenic | ton | 100 | 0 | 0 | to | 105 | 0 | 0 |
| Boric, cryst | ton | 69 | 0 | 0 | to | 70 | 0 | 0 |
| Carbolic, cryst. 39-40% | lb. | 0 | 0 | 6 | to | 0 | 0 | 6½ |
| Citric | lb. | 0 | 2 | 6 | to | 0 | 2 | 8 |
| Formic, 80% | ton | 77 | 0 | 0 | to | 80 | 0 | 0 |
| Gallic, pure | lb. | 0 | 4 | 0 | to | 0 | 4 | 3 |
| Hydrofluoric | lb. | 0 | 0 | 8½ | to | 0 | 0 | 9 |
| Lactic, 50 vol | ton | 37 | 10 | 0 | to | 40 | 0 | 0 |
| Lactic, 60 vol. | ton | 42 | 10 | 0 | to | 45 | 0 | 0 |
| Nitric, 80 Tw | ton | 41 | 0 | 0 | to | 44 | 0 | 0 |
| Oxalic | lb. | 0 | 0 | 10 | to | 0 | 0 | 11 |
| Phosphoric, 1.5 | ton | 55 | 0 | 0 | to | 57 | 0 | 0 |
| Pyrogallic, cryst | lb. | 0 | 8 | 0 | to | 0 | 8 | 3 |
| Salicylic, Technical | lb. | 0 | 1 | 0 | to | 0 | 1 | 2 |
| Salicylic, B.P. | lb. | 0 | 1 | 6 | to | 0 | 1 | 9 |
| Sulphuric, 92-93% | ton | 8 | 10 | 0 | to | 8 | 15 | 0 |
| Tannic, commercial | lb. | 0 | 3 | 6 | to | 0 | 3 | 9 |
| Tartaric | lb. | 0 | 1 | 9 | to | 0 | 1 | 10 |
| Alum, lump | ton | 18 | 0 | 0 | to | 18 | 10 | 0 |
| Alum, chrome | ton | 45 | 0 | 0 | to | 50 | 0 | 0 |
| Alumino ferric | ton | 9 | 0 | 0 | to | 9 | 10 | 0 |
| Aluminium, sulphate, 14-15% | ton | 15 | 0 | 0 | to | 16 | 0 | 0 |
| Aluminium, sulphate, 17-18% | ton | 18 | 0 | 0 | to | 19 | 0 | 0 |
| Ammonia, anhydrous | lb. | 0 | 2 | 2 | to | 0 | 2 | 4 |
| Ammonia, .880 | ton | 43 | 0 | 0 | to | 45 | 0 | 0 |
| Ammonia, .920 | ton | 30 | 0 | 0 | to | 32 | 10 | 0 |
| Ammonia, carbonate | lb. | 0 | 0 | 4 | to | | — | |
| Ammonia, chloride | ton | 65 | 0 | 0 | to | 70 | 0 | 0 |
| Ammonia, muriate (galvanisers) | ton | 50 | 0 | 0 | to | 52 | 0 | 0 |
| Ammonia, nitrate | ton | 55 | 0 | 0 | to | 60 | 0 | 0 |
| Ammonia, phosphate | ton | 95 | 0 | 0 | to | 100 | 0 | 0 |
| Ammonia, sulphocyanide | lb. | 0 | 3 | 0 | to | 0 | 3 | 0 |
| Amyl acetate | ton | 420 | 0 | 0 | to | 425 | 0 | 3 |
| Arsenic, white, powdered | ton | 52 | 0 | 0 | to | 55 | 0 | 0 |
| Barium, carbonate, 92-94% | ton | 12 | 10 | 0 | to | 13 | 0 | 0 |
| Barium, chlorate | lb. | 0 | 0 | 11 | to | 0 | 1 | 0 |
| Chloride | ton | 20 | 0 | 0 | to | 21 | 0 | 0 |
| Nitrate | ton | 50 | 0 | 0 | to | 52 | 0 | 0 |
| Barium Sulphate, blanc fixe, dry | ton | 30 | 0 | 0 | to | 31 | 0 | 0 |
| Sulphate, blanc fixe, pulp | ton | 16 | 10 | 0 | to | 17 | 0 | 0 |
| Sulphocyanide, 95% | lb. | 0 | 1 | 6 | to | 0 | 1 | 0 |
| Bleaching powder, 35-37% | ton | 20 | 0 | 0 | to | 21 | 0 | 0 |
| Borax crystals | ton | 34 | 0 | 0 | to | 36 | 0 | 0 |
| Calcium acetate, Brown | ton | 12 | 0 | 0 | to | 13 | 0 | 0 |
| ,, Grey | ton | 19 | 0 | 0 | to | 21 | 0 | 0 |
| Calcium Carbide | ton | 29 | 0 | 0 | to | 30 | 0 | 0 |
| Chloride | ton | 12 | 10 | 0 | to | 13 | 0 | 0 |
| Carbon bisulphide | ton | 65 | 0 | 0 | to | 67 | 0 | 0 |
| Casein, technical | ton | 90 | 0 | 0 | to | 92 | 0 | 0 |
| Cerium oxalate | lb. | 0 | 3 | 9 | to | 0 | 4 | 0 |
| Chromium acetate | lb. | 0 | 1 | 2 | to | 0 | 1 | 4 |
| Cobalt acetate | lb. | 0 | 11 | 6 | to | 0 | 12 | 6 |
| Oxide, black | lb. | 0 | 16 | 0 | to | | — | |
| Copper chloride | lb. | 0 | 1 | 3 | to | 0 | 1 | 6 |
| Sulphate | ton | 35 | 0 | 0 | to | 37 | 0 | 0 |
| Cream Tartar, 98-100% | ton | 130 | 0 | 0 | to | 135 | 0 | 0 |
| Epsom salts (*see* Magnesium sulphate) | | | | | | | | |
| Formaldehyde 40% vol | ton | 110 | 0 | 0 | to | 112 | 10 | 0 |
| Formusol (Rongalite) | lb. | 0 | 4 | 9 | to | 0 | 5 | 1 |
| Glauber salts, commercial | ton | 6 | 0 | 0 | to | 7 | 0 | 0 |
| Glycerine, crude | ton | 70 | 0 | 0 | to | 72 | 10 | 0 |
| Hydrogen peroxide, 12 vols. | gal. | 0 | 2 | 8 | to | 0 | 2 | 9 |
| Iron perchloride | ton | 45 | 0 | 0 | to | 50 | 0 | 0 |
| Iron sulphate (Copperas) | ton | 4 | 0 | 0 | to | 4 | 5 | 0 |

| | per | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Lead acetate, white | ton | 50 | 0 | 0 | to | 52 | 0 | 0 |
| Carbonate (White Lead) | ton | 43 | 0 | 0 | to | 46 | 0 | 0 |
| Nitrate | ton | 55 | 0 | 0 | to | 57 | 0 | 0 |
| Litharge | ton | 38 | 10 | 0 | to | 40 | 0 | 0 |
| Lithopone, 30% | ton | 30 | 0 | 0 | to | 32 | 10 | 0 |
| Magnesium chloride | ton | 18 | 0 | 0 | to | 19 | 0 | 0 |
| Carbonate, light | cwt. | 2 | 15 | 0 | to | 3 | 0 | 0 |
| Sulphate (Epsom salts commercial) | ton | 10 | 10 | 0 | to | 11 | 10 | 0 |
| Sulphate (Druggists') | ton | 18 | 10 | 0 | to | 19 | 10 | 0 |
| Manganese, Borate | ton | 70 | 0 | 0 | to | 75 | 0 | 0 |
| Sulphate | ton | 75 | 0 | 0 | to | 78 | 0 | 0 |
| Methyl acetone | ton | 95 | 0 | 0 | to | 100 | 0 | 0 |
| Alcohol, 1% acetone | ton | 145 | 0 | 0 | to | 150 | 0 | 0 |
| Nickel sulphate, single salt | ton | 60 | 0 | 0 | to | 62 | 0 | 0 |
| Nickel ammonium sulphate, double salt | ton | 62 | 0 | 0 | to | 64 | 0 | 0 |
| Potash, Caustic | ton | 45 | 0 | 0 | to | 50 | 0 | 0 |
| Potassium bichromate | lb. | 0 | 0 | 9½ | to | | — | |
| Carbonate, 90% | ton | 55 | 0 | 0 | to | 60 | 0 | 0 |
| Chloride | ton | 38 | 0 | 0 | to | 40 | 0 | 0 |
| Chlorate | lb. | 0 | 0 | 8½ | to | 0 | 0 | 9 |
| Meta bisulphite, 50-52% | ton | 150 | 0 | 0 | to | 160 | 0 | 0 |
| Nitrate, refined | ton | 50 | 0 | 0 | to | 52 | 0 | 0 |
| Permanganate | lb. | 0 | 2 | 0 | to | 0 | 2 | 3 |
| Prussiate, red | lb. | 0 | 2 | 6 | to | 0 | 2 | 9 |
| Prussiate, yellow | lb. | 0 | 1 | 6 | to | 0 | 1 | 7 |
| Sulphate, 90% | ton | 31 | 0 | 0 | to | 33 | 0 | 0 |
| Salammoniac, firsts | cwt. | 3 | 15 | 0 | to | | — | |
| Seconds | cwt. | 3 | 10 | 0 | to | | — | |
| Sodium acetate | ton | 35 | 0 | 0 | to | 37 | 10 | 0 |
| Arsenate, 45% | ton | 60 | 0 | 0 | to | 62 | 0 | 0 |
| Bicarbonate | ton | 10 | 10 | 0 | to | 11 | 0 | 0 |
| Bichromate | lb. | 0 | 0 | 7½ | to | 0 | 0 | 8 |
| Bisulphite, 60-62% | ton | 37 | 10 | 0 | to | 40 | 0 | 0 |
| Chlorate | lb. | 0 | 0 | 5½ | to | 0 | 0 | 5½ |
| Caustic, 70% | ton | 24 | 0 | 0 | to | 24 | 10 | 0 |
| Caustic, 76% | ton | 25 | 0 | 0 | to | 25 | 10 | 0 |
| Hydrosulphite, powder, 85% | lb. | 0 | 2 | 3 | to | 0 | 2 | 6 |
| Hyposulphite, commercial | ton | 22 | 0 | 0 | to | 24 | 0 | 0 |
| Nitrite, 96-98% | ton | 48 | 0 | 0 | to | 50 | 0 | 0 |
| Phosphate, crystal | ton | 25 | 0 | 0 | to | 27 | 0 | 0 |
| Perborate | lb. | 0 | 1 | 9 | to | 0 | 2 | 0 |
| Prussiate | lb. | 0 | 0 | 8 | to | 0 | 0 | 8½ |
| Sodium Sulphide, crystals | ton | 20 | 0 | 0 | to | 23 | 0 | 0 |
| Sulphide, solid, 60-62% | ton | 30 | 0 | 0 | to | 32 | 0 | 0 |
| Sulphite, cryst | ton | 15 | 0 | 0 | to | 16 | 0 | 0 |
| Strontium carbonate | ton | 85 | 0 | 0 | to | 90 | 0 | 0 |
| Strontium Nitrate | ton | 84 | 0 | 0 | to | 90 | 0 | 0 |
| Strontium Sulphate, white | ton | 8 | 10 | 0 | to | 10 | 0 | 0 |
| Sulphur chloride | ton | 42 | 0 | 0 | to | 44 | 10 | 0 |
| Sulphur, Flowers | ton | 19 | 0 | 0 | to | 19 | 10 | 0 |
| Roll | ton | 19 | 0 | 0 | to | 19 | 10 | 0 |
| Tartar emetic | lb. | 0 | 2 | 3 | to | 0 | 2 | 6 |
| Tin perchloride, 33% | lb. | 0 | 2 | 6 | to | 0 | 2 | 7 |
| Perchloride, solid | lb. | 0 | 3 | 0 | to | 0 | 3 | 3 |
| Protochloride (tin crystals) | lb. | 0 | 1 | 8 | to | 0 | 1 | 9 |
| Zinc chloride, 102 Tw. | ton | 22 | 0 | 0 | to | 23 | 10 | 0 |
| Chloride, solid, 96-98% | ton | 60 | 0 | 0 | to | 65 | 0 | 0 |
| Oxide, 99% | ton | 45 | 0 | 0 | to | 47 | 10 | 0 |
| Dust, 90% | ton | 90 | 0 | 0 | to | 92 | 10 | 0 |
| Sulphate | ton | 21 | 10 | 0 | to | 23 | 10 | 0 |

### Coal Tar Intermediates, &c.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Alphanaphthol, crude | lb. | 0 | 4 | 0 | to | 0 | 4 | 3 |
| Alphanaphthol, refined | lb. | 0 | 4 | 6 | to | 0 | 4 | 9 |
| Alphanaphthylamine | lb. | 0 | 3 | 0 | to | 0 | 3 | 3 |
| Aniline oil, drums extra | lb. | 0 | 1 | 7 | to | 0 | 1 | 8 |
| Aniline salts | lb. | 0 | 1 | 8 | to | 0 | 1 | 10 |
| Anthracene, 85-90% | lb. | | — | | to | | — | |
| Benzaldehyde (free of chlorine) | lb. | 0 | 4 | 9 | to | 0 | 5 | 0 |
| Benzidine, base | lb. | 0 | 8 | 6 | to | 0 | 9 | 0 |
| Benzidine, sulphate | lb. | 0 | 9 | 0 | to | 0 | 9 | 6 |
| Benzoic acid | lb. | 0 | 2 | 3 | to | 0 | 2 | 6 |
| Benzoate of soda | lb. | 0 | 2 | 0 | to | 0 | 2 | 3 |
| Benzyl chloride, technical | lb. | 0 | 2 | 0 | to | 0 | 2 | 3 |
| Betanaphthol benzoate | lb. | 0 | 8 | 0 | to | 0 | 8 | 6 |
| Betanaphthol | lb. | 0 | 2 | 9 | to | 0 | 3 | 0 |
| Betanaphthylamine, technical | lb. | 0 | 9 | 6 | to | 0 | 10 | 0 |
| Croceine Acid, 100% basis | lb | 0 | 5 | 0 | to | 0 | 6 | 3 |
| Dichlorbenzol | lb. | 0 | 0 | 9 | to | 0 | 0 | 10 |
| Diethylaniline | lb. | 0 | 6 | 9 | to | 0 | 7 | 6 |
| Dinitrobenzol | lb. | 0 | 1 | 5 | to | 0 | 1 | 6 |
| Dinitrochlorbenzol | lb. | 0 | 1 | 5 | to | 0 | 1 | 6 |
| Dinitronaphthaline | lb. | 0 | 1 | 6 | to | 0 | 1 | 8 |
| Dinitrotoluol | lb. | 0 | 1 | 8 | to | 0 | 1 | 9 |
| Dinitrophenol | lb. | 0 | 3 | 0 | to | 0 | 3 | 3 |
| Dimethylaniline | lb. | 0 | 4 | 0 | to | 0 | 4 | 3 |
| Diphenylamine | lb. | 0 | 4 | 6 | to | 0 | 4 | 9 |

| | per | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| H-Acid | lb. | 0 | 10 | 0 | to | 0 | 10 | 6 |
| Metaphenylenediamine | lb. | 0 | 5 | 9 | to | 0 | 6 | 0 |
| Monochlorbenzol | lb. | 0 | 0 | 10 | to | 0 | 1 | 0 |
| Metanilic Acid | lb. | 0 | 7 | 6 | to | 0 | 8 | 0 |
| Monosulphonic Acid (2:7) | lb. | 0 | 7 | 6 | to | 0 | 8 | 0 |
| Naphthionic acid, crude | lb. | 0 | 4 | 0 | to | 0 | 4 | 3 |
| Naphthionate of Soda | lb. | 0 | 4 | 3 | to | 0 | 4 | 6 |
| Naphthylamin-di-sulphonic-acid | lb. | 0 | 5 | 0 | to | 0 | 5 | 6 |
| Nitronaphthalene | lb. | 0 | 1 | 5 | to | 0 | 1 | 6 |
| Nitrotoluol | lb. | 0 | 1 | 4 | to | 0 | 1 | 5 |
| Orthoamidophenol, base | lb. | 0 | 18 | 0 | to | 1 | 0 | 0 |
| Orthodichlorbenzol | lb. | 0 | 1 | 1 | to | 0 | 1 | 2 |
| Orthotoluidine | lb. | 0 | 2 | 3 | to | 0 | 2 | 6 |
| Orthonitrotoluol | lb. | 0 | 0 | 10 | to | 0 | 1 | 0 |
| Para-amidophenol, base | lb. | 0 | 12 | 6 | to | 0 | 13 | 0 |
| Para-amidophenol, hydrochlor | lb | 0 | 13 | 0 | to | 0 | 13 | 6 |
| Paradichlorbenzol | lb. | 0 | 0 | 7 | to | 0 | 0 | 8 |
| Paranitraniline | lb. | 0 | 4 | 3 | to | 0 | 4 | 6 |
| Paranitrophenol | lb. | 0 | 2 | 9 | to | 0 | 3 | 0 |
| Paranitrotoluol | lb. | 0 | 5 | 9 | to | 0 | 6 | 0 |
| Paraphenylenediamine, distilled | lb. | 0 | 13 | 6 | to | 0 | 14 | 6 |
| Paratoluidine | lb. | 0 | 7 | 6 | to | 0 | 8 | 0 |
| Phthalic anhydride | lb. | 0 | 3 | 9 | to | 0 | 4 | 0 |
| Resorcin, technical | lb. | 0 | 7 | 6 | to | 0 | 8 | 0 |
| Resorcin, pure | lb. | 0 | 6 | 9 | to | 0 | 7 | 0 |
| Salol | lb. | 0 | 3 | 6 | to | 0 | 3 | 9 |
| Sulphanilic acid, crude | lb. | 0 | 1 | 4 | to | 0 | 1 | 6 |
| Tolidine, base | lb. | 0 | 8 | 6 | to | 0 | 10 | 0 |
| Tolidine, mixture | lb. | 0 | 2 | 9 | to | 0 | 3 | 0 |

## Metals and Ferro Alloys

*The following prices are furnished by Messrs. Miles, Mole & Co., Ltd., 101, Leadenhall Street, London, E.C.*

| | per | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Aluminium, 98-99% | ton | 150 | 0 | 0 | to | 150 | 0 | 0 |
| Antimony, English | ton | 37 | 0 | 0 | to | 40 | 0 | 0 |
| Copper, Best Selected | ton | 72 | 0 | 0 | to | 75 | 0 | 0 |
| Ferro-Chrome, 4-6% | ton | 37 | 0 | 0 | to | 38 | 0 | 0 |
| Ferro-Chrome Manganese, loose | ton | 25 | 0 | 0 | to | 26 | 0 | 0 |
| Silicon, 45-50% | ton | 18 | 0 | 0 | to | 20 | 0 | 0 |
| Tungsten, 75-80% | lb. | 0 | 2 | 2 | to | 0 | 2 | 2 |
| Lead Ingot | ton | 23 | 0 | 0 | to | 25 | 0 | 0 |
| Lead Sheets | ton | 34 | 0 | 0 | to | 35 | 0 | 0 |
| Nickel, 98-99% | ton | 197 | 0 | 0 | to | 198 | 0 | 0 |
| Tin | ton | 172 | 0 | 0 | to | 173 | 0 | 0 |
| Spelter | ton | 26 | 0 | 0 | to | 26 | 0 | 0 |

## Structural Steel

| | Per | £ | s. | d. | | £ | s. | d. |
|---|---|---|---|---|---|---|---|---|
| Angles and Tees | ton | 19 | 0 | 0 | to | 20 | 0 | 0 |
| Flats and Rounds | ton | 18 | 0 | 0 | to | 19 | 0 | 0 |
| Joists | ton | 18 | 0 | 0 | to | 19 | 0 | 0 |
| Plates | ton | 20 | 0 | 0 | to | 21 | 0 | 0 |
| Rails, heavy | ton | 16 | 0 | 0 | to | 17 | 0 | 0 |
| Sheets, 24 Gauge | ton | 20 | 0 | 0 | to | 21 | 0 | 0 |
| Galvanized Corrd. Sheets | ton | 21 | 0 | 0 | to | 22 | 0 | 0 |
| Zinc Sheets | ton | 32 | 0 | 0 | to | 33 | 0 | 0 |

## Wood Distillation in Japan

AN important Japanese industry which owed its inception to the war, states a *Times* correspondent, is wood distillation. At the outbreak of hostilities the rubber planters in the East saw themselves completely cut off from supplies of acetic acid (hitherto obtained from Germany), which they used for coagulating the rubber latex. Japan stepped in to fill the breach and succeeded in supplying the planters with the acid they required—although at first it was made entirely from imported calcium acetate.

At the present time the Japanese manufacturers are making every effort to retain the markets they conquered during the war. The wood-distillation industry is now supplying sufficient acetone to meet the home demand, and also increasing quantities of methyl alcohol.

Ethyl alcohol was, until about 20 years ago, imported from Germany and used in the preparation of the national beverage *sake*. Heavy import duties put an end to this source of supply, and a home industry was gradually established. This spirit, so important to the fine chemical industry, is now made from the residues of the sugar factories in Taiwan. The output naturally fluctuates with the yield of sugar; in 1919 it was 3,000,000 gallons, but in 1920, owing to a poor sugar crop, some 800,000 gallons only.

## Indian Chemical Industry

THE Review of the Trade of India in 1919-20, issued by the Department of Statistics, India, refers to several interesting features in the year's imports of chemicals as compared with the preceding year. The chief points noted were an appreciable decrease in the total value of all chemicals imported; a large increase in the quantities of acids, alum, ammonia and salts thereof, copperas, caustic soda, and sulphur; and a restricted importation of carbide of calcium, sodium carbonate, and soda bicarbonate. The total value of chemicals imported amounted to R1,61 lakhs, as against R2,49 lakhs in the preceding year, showing a decrease of 35 per cent. In acids there was an increase of 34 per cent. in quantity, which amounted to 620 tons, accompanied with a decrease of 46 per cent. in value.

Nearly two-fifths of these imports consisted of sulphuric acid, which increased to 236 tons from only 2 tons in 1918-19. Acetic, carbolic, oxalic, and tartaric acids were separately specified in the accounts from the beginning of the year under review. Acetate and litharge under lead compounds and zinc chloride under zinc compounds were also shown separately during the year.

The quantity of sulphur for the manufacture of sulphuric acid increased by 50 per cent. to 7,200 tons. Japan supplied four-fifths of the quantity, as against over 99 per cent. in 1918-19. The remainder came mainly from Italy and the United States. Bleaching materials, disinfectants, and caustic soda showed increases in quantity coupled with a decrease in value. Bleaching powder including chloride of lime and naphthalene were specified separately during the year and also bichromate and chromate soda and sodium cyanide.

## Rock Phosphate in South Pacific

FOR a considerable period phosphate rock has been shipped from Ocean Island, which constitutes a part of the Crown colony of the Gilbert and Ellice Islands, to various parts of the world, particularly Australia and New Zealand. Subsequently the phosphate deposits in Nauru Island in the Bismarck Archipelago, were worked by a company under a concession from the German Government. According to the *Bulletin* of the Canadian Department of Trade and Commerce, the principal content of the phosphate deposits on both islands is about 82 to 84 per cent. tribasic phosphate of lime.

It is stated that the present annual production of phosphate rock at Ocean and Nauru Islands is about 350,000 tons. So far, Australia has been the most important market, to which 200,000 tons per annum are exported. New Zealand also imports a considerable quantity from the same sources. A large quantity has been shipped from year to year to Japan. The loading at the islands is by means of surf boats, from cantilever jetties to the steamers moored about 300 yards from the shore. Depending on weather conditions, from 1,000 to 1,200 tons can be loaded daily. So far there has been no difficulty in obtaining adequate native labour, and it is unlikely any untoward development in this regard will take place. The value of the deposits at these islands can scarcely be conjectured, as it is stated (depending upon production) there is sufficient rock to keep the works going at least for the next fifty years, hence the value may modestly be computed at £50,000,000 although much higher estimates have been given.

THE BEHAVIOUR OF METHANE at high temperatures alone and in contact with the other constituents in firedamp explosions is discussed by H. Winter in *Brennstoff-Chem.* In mixtures of pure methane and air containing 5·0-9·2 per cent. $CH_4$ combustion takes place according to the equation $CH_4+2O_2=CO_2+2H_2O$. In mixtures containing 9·2-14 per cent. $CH_4$ combustion of the methane is incomplete. In addition to carbon dioxide, water, and hydrogen, the residues contain carbon monoxide when the ratio $O_2 : CH_4$ is somewhat greater than, equal to, or less than 2·0 : 1. When the concentration of oxygen becomes smaller, hydrogen appears in addition to carbon dioxide and monoxide, nitrogen, and water. The explosion under these conditions is also accompanied by a deposition of carbon within a small area.

# Company News

NITRATE RAILWAYS COMPANY.—The transfer books are closed from May 11 to 24.

LIVERPOOL NITRATE CO.—The directors announce an interim dividend of 2s. 6d. per share less tax, payable May 25. Last year, dividend 2s. per share free of tax. Transfer books closed from May 5 to 25, inclusive.

ANGLO-CHILIAN NITRATE & RAILWAY.—The directors announce a dividend of 15s. per preference share and 15s. per ordinary share, both tax free, making 25 per cent., tax free, on both classes, for the year 1920, payable May 26.

DORMAN, LONG & CO.—The directors announce an interim dividend of 2½ per cent., tax free, on the ordinary shares and a dividend of 8 per cent. per annum, less tax, on the preferred ordinary shares for the half-year to March 31 last.

LAUTARO NITRATE CO.—An extraordinary general meeting of the Lautaro Nitrate Co., Ltd., will be held at Winchester House, Old Broad Street, E.C., on May 17, at noon, to consider a provisional agreement entered into between the company and Messrs. Cellin & Cie, Paris.

UNITED ALKALI CO.—At a meeting of debenture-holders of the United Alkali Co., Ltd., held at Liverpool on Tuesday, a resolution was passed authorising the directors to issue an additional £785,000 of new debenture stock, to rank *pari passu* with the present debenture stock, making a total aggregate issue of £3,500,000 of debenture stock.

BRITISH COTTON AND WOOL DYERS.—The accounts show a net profit of £130,447. Sums of £25,000 are placed to both depreciation and investment contingency funds, and a dividend of 10 per cent. is declared on the ordinary shares, the same as last year. £23,699 is carried forward against £33,753 brought in. The transfer books of the ordinary shares will be closed from May 15 to 31.

UNITED GLASS BOTTLE MANUFACTURERS.—The company is offering, through the British, Foreign & Colonial Corporation, £600,000 first mortgage debentures at par, bearing interest at 7 per cent., tax free up to 6s. in the £, and redeemable by 12 annual drawings at 103. The bonds will be secured upon assets valued at £1,665,419; the profits of the company for the past five years cover the debenture charges nearly two and a half times and 1920 profits nearly four times.

ALLEN LIVERSIDGE.—Applications have been invited for an issue of 106,280 ordinary shares of £1 each at par. The shares constitute the unissued remainder of the authorised capital of £300,000, and there are no preference shares, while the only other capital commitment is £50,000 of debentures issued to secure a temporary loan from the company's bankers. This loan it is proposed to repay from the proceeds of the present issue; the remainder of the sum is to be utilised for further working capital needed to provide for necessary extensions to the company's business. The auditors' report shows a steady rise in dividends from 6 per cent. in 1916 to 12½ per cent. last year.

NOBEL INDUSTRIES, LTD.—A Stock Exchange announcement states that dealings in 2,440 ordinary shares of £1 each, fully paid, Nos. 7,470,708 to 7,472,588 and 7,581,397 to 7,581,955; 2,474 6 per cent. cumulative preference shares of £1 each, fully paid, Nos. 5,984,957 to 5,986,642 and 6,231,278 to 6,232,065; and 276 deferred shares of £1 each fully paid, Nos. 1,443,086 to 1,443,361, have been specially allowed by the committee under Temporary Regulation 4 (3) (these securities will rank *pari passu* with those in which specia settling days have already been appointed as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted).

JOHN BELL & CROYDEN, LTD.—The company has been formed to acquire the undertakings of John Bell & Croyden, Ltd., chemists, of Wigmore Street, W., and Langham Brothers, Ltd., fine chemical and perfumery manufacturers, of Perivale Laboratories and Works, Perivale, W.13., and has a capital of £150,000 divided into 144,000 10 per cent. cumulative participating preference shares of £1 each and 120,000 ordinary shares of 1s. each. The ordinary shares are reserved for allotment to the vendors or their nominees and the directors and employees of the company. The company has been making an issue of 90,000 10 per cent. cumulative participating preference shares of £1 each at par, payable 5s. on application, 7s. 6d. on allotment, and 7s. 6d. on June 7. With regard to scientific glassware, the prospectus states that the company is in a unique position, having its own modern plant for its production. The subscription list was opened on May 7 and closes to-day (Saturday).

BRUNNER, MOND & CO.—The company have been offering for subscription at par 2,500,000 7½ per cent. cumulative preference shares of £1 each, payable 2s. on application, 8s. on May 27, and 10s. on October 3. The authorised capital of the company is £15,000,000, of which £4,000,000, including the present issue, are in 7½ per cent. cumulative preference and £9,577,843 in ordinary shares of £1 each. The balance of the authorised capital may be issued as preference or ordinary shares at the discretion of the directors. The shares now offered will rank for dividend as to 10s. per share from May 1, and as fully paid from October 1 next. They will carry one vote for every 10 shares, and rank for dividend and return of capital *pari passu* with the existing 7½ per cent. cumulative preference shares. The profits for the 10 years ended March 31, 1920, the prospectus states, have averaged £925,894 per annum, which is sufficient to pay the dividend on the existing preference shares and those now issued, and leave a balance of £625,894. At March 31, 1920, the assets were certified to exceed the liabilities by more than £11,750,000, excluding goodwill. The subscription list, which opened on Monday, closed on Tuesday morning. It is understood that the issue was largely over-subscribed.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

| LOCALITY OF FIRM OR AGENT. | MATERIALS. | REF. NO. |
|---|---|---|
| Montreal ... | Asbestos ... ... ... ... | — |
| Johannesburg | Glass ... ... ... ... | 566 |
| Johannesburg | Asbestos ... ... ... ... | — |
| Egypt ... | Glasspaper; oils; paints ... | — |
| Antwerp ... | Metals; chemicals; paints; varnishes; leather | 571 |
| Christiana ... | Technical and edible oils ... ... | 581 |
| Barcelona ... | Chemical and pharmaceutical products; colours; paints; varnishes | 586 |
| Havana ... | Paints; varnishes ... ... | 592 |
| Paris ... ... | Pharmaceutical products... ... | 609 |
| Belgrave ... | Drugs ... ... ... ... | 615A |
| Massachusetts | Chemicals, dyes ... ... ... | 618 |
| Buenos Aires.. | Chemicals ... ... ... | 619 |
| Buenos Aires.. | Sulphate of Alumina. Replies to the Enquiry Office of the Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W.1. | — |

## Tariff Changes

BELGIUM.—Sulphuric ether may now be imported into Belgium without import licence requirement.

GERMANY (OCCUPIED TERRITORY).—Synthetic dyestuffs are not included in the regulations provisionally allowing the import and export, without licence, to and from the Occupied Territory, of postal parcels containing not more than 5 kilogs. of commodities.

LUXEMBURG.—Licences are required for the export of chemical and natural manures.

MEXICO.—Regulations have been framed regarding the certification of Consular invoices of goods shipped to Mexico, and fixing the fees to be paid for such certification. No fees are chargeable in the cases of the following goods: Zinc and aluminium sheets for the treatment of ores; impure mineral oils; sulphuric and nitric acids; alkaline cyanides; hyposulphite of soda; sulphate of copper; machinery for industrial purposes; detonators; dynamite and similar explosives.

NORWAY.—The prohibition on the exportation of pyrites and residues of pyrites containing copper is now withdrawn.

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## London Gazette

### Partnerships Dissolved

CHEANEY, A., and HAWTHORNE, J. T., carrying on business as leather dressers, at Kettering, Northampton, under the style of Kettering Leather Company, by mutual consent as and from May 6, 1921. All debts will be received and paid by A. Cheaney.

KIRKHAM, J. R., and WEIGHTMAN, D., carrying on business as manufacturers of lighting glassware, at Prince's Square, and at Bilston Road, Wolverhampton, under the style of the London & Midland Lighting Co,. by mutual consent as and from April 30, 1921. All debts will be received and paid by J. R. Kirkham.

### Notice of Dividend

DAVIS, H. J., 58, White Hart Lane, Barnes, Surrey, oil and colourman. Court, Wandsworth. Amount per £, 6¼d. Supplemental. May 25, 1921. Offices of the Official Receiver, 132, York Road, Westminster Bridge Road, S.E. 1.

### Application for Discharge

BONAVENTURA, F. A., 97A, Armitage Mansions, Golder's Green Road, Golder's Green, trading in co-partnership with H. E. Aveline, and E. Harrison, as Felice Bonaventura & Co., 24, Great Tower Street, London, E.C., chemical merchant and importer. High Court of Justice. May 25, 1921, 11 a.m. Bankruptcy Buildings, Carey Street, London, W.C. 2.

### Order Made on Application for Discharge

SLADE, J., and WALKER, J. A. R., carrying on business in co-partnership under the style of Hopex Drug Co., at 9, Corporation Street, Stalybridge, Chester, John Slade, residing at the above address, and J. A. R. Walker, residing in apartments at 31, Crofts Bank Road, Urmston, Lancaster. Court, Ashton-under-Lyne and Stalybridge. Ashworth, W., 3, York Street, Burnley, Incorporated Accountant Date of certificate of appointment, May 3. 1921.

### Companies Winding Up Voluntarily.

HERTS BENZOL CO., LTD. (in voluntary liquidation).—E. H. Hawkins, 4, Charterhouse Square, London, Liquidator.

PARSANI OIL ESTATE SYNDICATE, LTD. (in voluntary liquidation).—A meeting of creditors will be held at 27, Old Jewry, London, on Monday, May 23, 1921, at 11 a.m. G. W. Stevens, Liquidator.

SPRING GARDENS CHEMICAL CO., LTD.—Mr. Law Netherwood, Hawkesby's Court, New Street, Huddersfield, Liquidator.

## Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of* 1908, *provides that every Mortgage or Charge, as described therein, created after July* 1, 1908, *shall be registered within* 21 *days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July* 1, 1908, *require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.*]

CLEVELAND METAL CO., LTD. (late IMESON, FINCH & CO. (1912), LTD.), Stockton-on-Tees.—Reg. April 27, £3,000 debentures; general charge. *Nil. July 4, 1919.

### Satisfaction

BRITISH TAR PRODUCTS, LTD. (late BRITISH GENERAL TAR PRODUCTS, LTD.), London, S.W.—Satisfaction reg. May 2, £12,000, and further advances not ex. £20,000, reg. November 20, 1918.

## County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

MAY, P. W., & SON, 173, Smithdown Lane, Liverpool, dry-salters. £16 13s. 9d. March 24.

PAYNE, E. E. M., Red House, Narborough, analyst. £16 10s. 11d. March 18.

LUNN, N., Victoria Street, Grimsby, chemist. £25 19s. 6d. March 15.

EDWARDS, J. M., 311, Fulham Palace Road, chemist. £11 5s. 4d. March 21.

WOOLLDRIDGE, L. C., 4, Bramshill Road, Harlesden, chemist. £17 12s. 3d. March 21. £39 6s. 3d. March 24. £18 8s. 3d. March 23.

HEAP, R. E., 7, Longfield Road, Hartshill, Stoke-on-Trent, chemist. £10 7s. 7d, March 21.

WATSON, D. R., 159, Otley Road, Headingley, chemist. £14 15s. 10d. March 23.

## New Companies Registered

*The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents,* 116 *and* 117, *Chancery Lane, London, W.C.*2. :—

ARTIFICIAL COAL COMPANY (HAMON PROCESS), LIMITED. The Hamon Peat Works, Ballycumber, Kings County, Ireland. Incorporated in Jersey. Manufacturing fuel. Nominal capital, £120,000 in 100,000 preference ordinary shares of £1 each, and 400,000 deferred ordinary shares of 1s. each. Name of Person authorised to accept service: Louis Le Warner Hamon, Prospect Park, Ballycumber, King's County, Ireland (fuel manufacturer).

ASHLEE, LIMITED, Market Place, Riddings, Alfreton, Derby. Wholesale and retail chemists. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors: J. Ashworth, A. Lee, H. W. Daykin. Qualification of directors, £1.

BELL & CROYDEN (JOHN), LIMITED, 50, Wigmore Street, W. Chemical manufacturers, &c. Nominal capital, £150,000 in 144,000 10 per cent. cumulative participating preference shares of £1 each, and 120,000 ordinary shares of 1s. each. Minimum subscription: Seven shares. Directors: Sir S. R. Alexander (chairman), J. D. Marshall and C. A. P. Langham (managing directors), C. W. Faviell, J. R. Watts, W. L. Langham. Qualification of directors, £100. Remuneration of directors, £50 each; chairman £100.

FARNSWORTH (RICHARD), LIMITED, Lunmsdale, near Matlock, Derby. Bleacher and dyer. Nominal capital, £20,000 in 5,000 preference shares, and 15,000 ordinary shares of £1 each. Directors: H. Mountney, F. W. Gill, G. S. Marple. Qualification of directors, £100.

FERMOLIN, LIMITED, Fertilisers, manufacturers and dealers in fermolin. Nominal capital, £3,000 in 2,000 ordinary shares, and 1,000 preference shares of £1. Directors: J. Gordon, J. T. Hadley, J. D. Sadler. Qualification of directors, 20 shares.

WILCOCKSON (E. S. & J.), LTD. Leather manufacturers, &c. Nominal capital £14,000 in 14,000 shares of £1 each. Directors, E. S. Wilcockson, J. Wilcockson. Qualification of directors, £100.

YORKE & WALLACE, LTD., 1, Shell Road, Lewisham, S.E. 13. Varnish and colour manufacturers. Nominal capital £2,000 in 2,000 shares of £1 each. Directors, L. A. Hodson, H. M. Hills, G. Bernardes, J. Hodson, F. B. Hodson, W. H. R. Pollington. Qualification of directors, 50 shares.

PLANT FERTILISERS, LTD. (registered in the Isle-of-Man). Merchants and manufacturers of chemical manures and other compounds. Nominal capital £5,000 in 5,000 shares of £1 each. Person authorised to accept service: Harry Morton Burgess, 7a, Arnside Road, Southport.